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# PC WORLD

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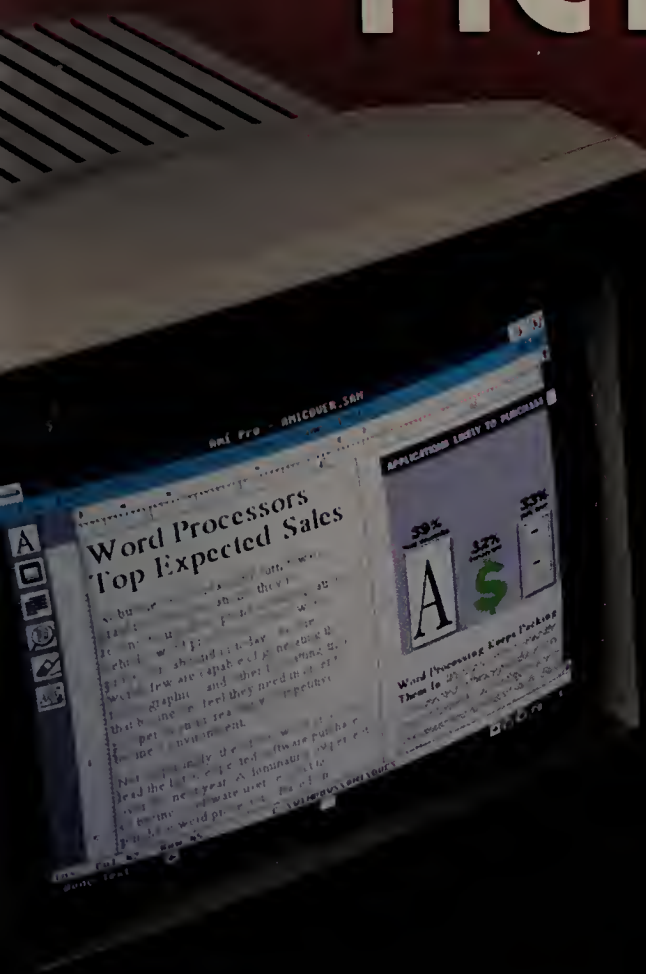


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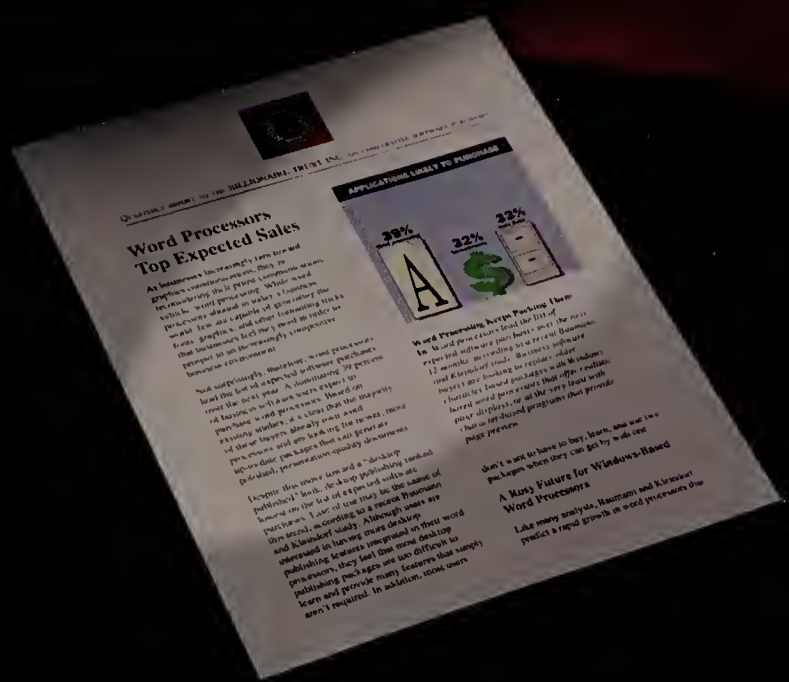


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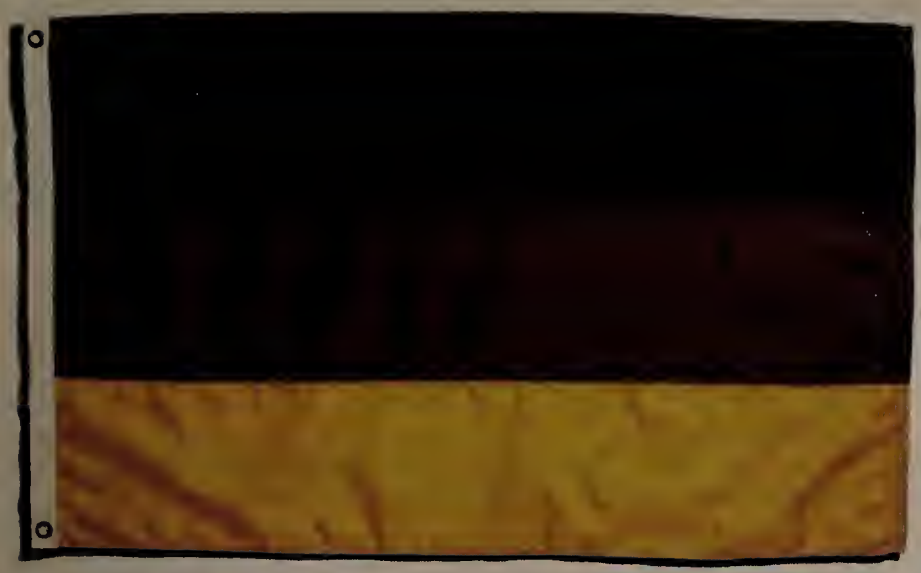

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PC MAGAZINE EDITOR'S CHOICE 2·14·89

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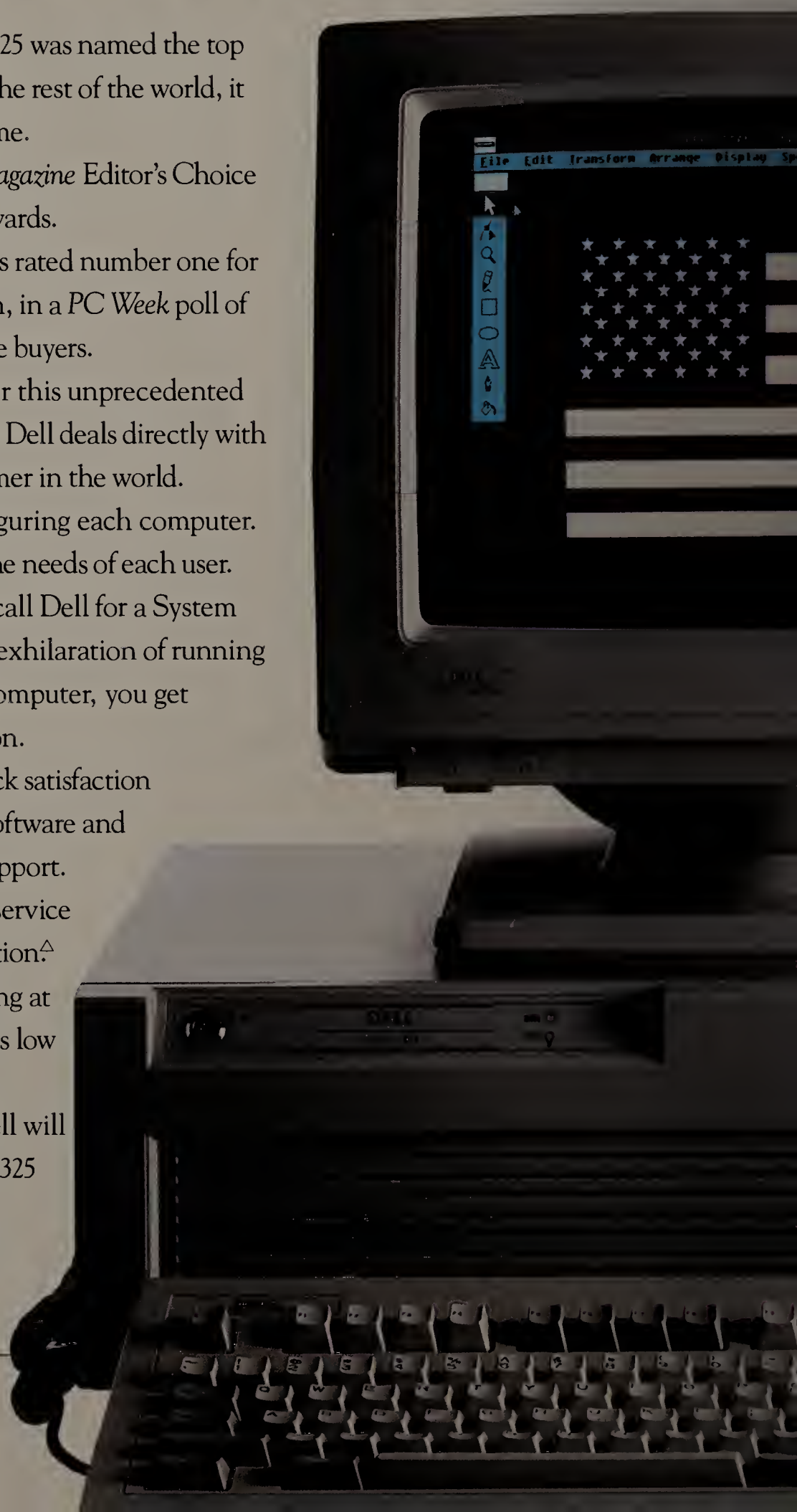

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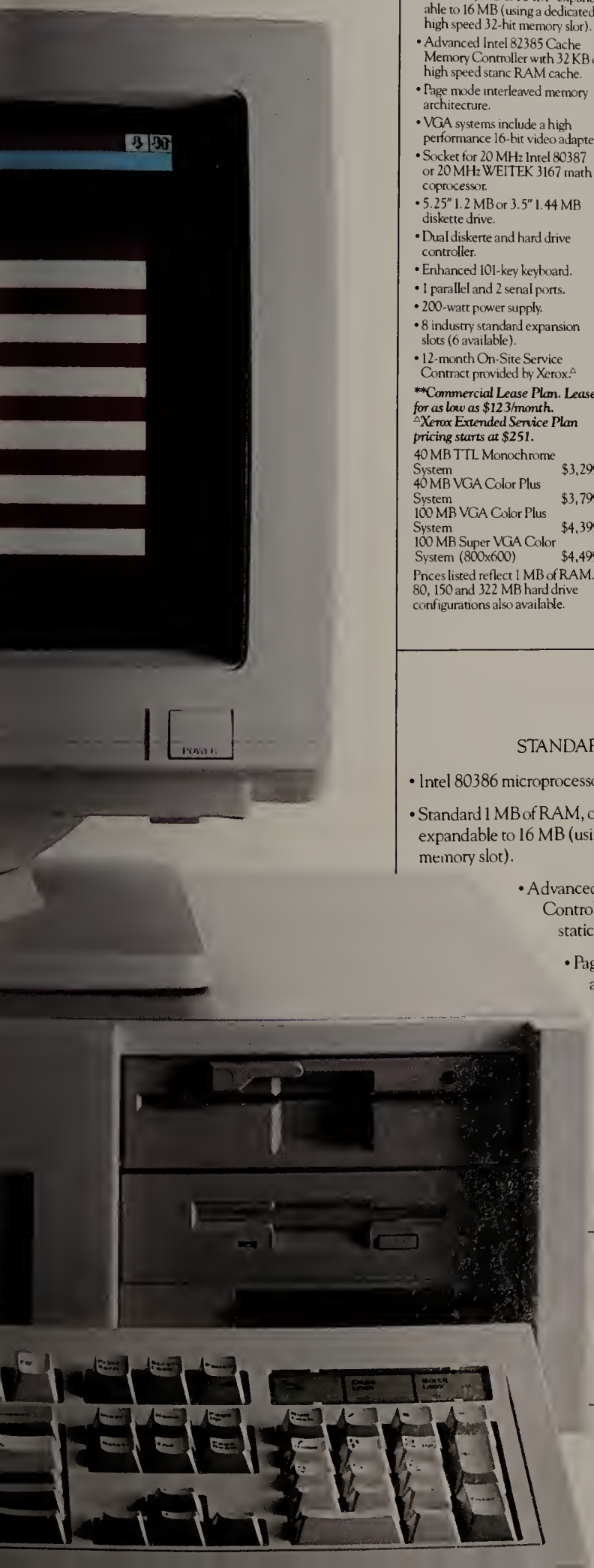

PC MAGAZINE EDITORS' CHOICE 11·29·88

THE DELL SYSTEM® 310
20 MHz 386.

The best combination of performance and value in its class.

STANDARD FEATURES:

- Intel 80386 microprocessor running at 20 MHz.
- Standard 1 MB of RAM, optional 2 MB or 4 MB of RAM* expandable to 16 MB (using a dedicated high speed 32-bit memory slot).
- Advanced Intel 82385 Cache Memory Controller with 32 KB of high speed static RAM cache.
- Page mode interleaved memory architecture.
- VGA systems include a high performance 16-bit video adapter.
- Socket for 20 MHz Intel 80387 or 20 MHz WEITEK 3167 math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Dual diskette and hard drive controller.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 200-watt power supply.
- 8 industry standard expansion slots (6 available).
- 12-month On-Site Service Contract provided by Xerox.△

*****Commercial Lease Plan. Lease for as low as $123/month.***
***△Xerox Extended Service Plan pricing starts at $251.***

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| 40 MB VGA Color Plus System | $3,799 |
| 100 MB VGA Color Plus System | $4,399 |
| 100 MB Super VGA Color System (800x600) | $4,499 |

Prices listed reflect 1 MB of RAM. 80, 150 and 322 MB hard drive configurations also available.

THE DELL SYSTEM® 316SX
16 MHz 386SX.

The perfect low profile mainstream computer, combining 386SX power and compatibility with unprecedented value and support.

STANDARD FEATURES:

- Intel 80386SX microprocessor running at 16 MHz.
- Standard 512 KB of RAM, optional 640 KB, 1 MB or 2 MB of RAM* expandable to 16 MB (8 MB on system board).
- Page mode interleaved memory architecture.
- LIM 4.0 support for memory over 640 KB.
- Integrated diskette and high performance 16-bit VGA video controller on system board.
- Socket for Intel 80387SX math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Integrated high performance hard disk interface on system board.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 3 full-sized 16-bit AT expansion slots available.
- 12-month On-Site Service Contract provided by Xerox.△

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| 40 MB VGA Color Plus System | $2,399 |
| 40 MB Super VGA System (800x600) | $2,499 |
| 100 MB Super VGA System (800x600) | $3,099 |

Prices reflect 512 KB of RAM. 640 KB versions of the above systems are available for an additional $50, 1 MB versions for an additional $150, and 2 MB versions for an additional $300.
80 and 170 MB configurations also available.

PC MAGAZINE EDITORS' CHOICE 3·13·90

THE NEW DELL SYSTEM® 316LT
16 MHz 386SX.

This new full-featured, battery powered 386SX laptop costs less than most 286 laptops.

STANDARD FEATURES:

- Intel 80386SX microprocessor running at 16 MHz.
- Standard 1 MB of RAM, optional 2 MB of RAM* expandable to 8 MB (on the system board using 1 MB SIMMs).
- LIM 4.0 support for memory over 1 MB.
- Adjustable and detachable 640 x 480 VGA Liquid Crystal Display.
- One industry standard half-size 8-bit expansion slot.
- Socket for 16 MHz Intel 80387SX math coprocessor.
- 3.5" 1.44 MB diskette drive.
- 83-key keyboard with embedded numeric keypad and separate cursor control keys.
- 1 parallel, 1 serial, and external VGA monitor port.
- Connector for 101-key keyboard or numeric keypad.
- Two Removable and rechargeable NiCad battery packs utilizing Dell's "Continuous Power Battery System" (patent pending).
- AC Adapter.
- 12-month On-Site Service Contract provided by Xerox.△

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| 20 MB, 2 MB RAM | $3,699 |
| 40 MB, 1 MB RAM | $3,799 |
| 40 MB, 2 MB RAM | $3,999 |

PC WORLD BEST BUY

THE DELL SYSTEM® 210
12.5 MHz 286.

The price says this is an entry-level system. The performance says it's a lot more.

STANDARD FEATURES:

- 80286 microprocessor 12.5 MHz.
- Standard 512 KB of RAM, optional 640 KB, 1 MB or 2 MB of RAM* expandable to 16 MB (6 MB on the system board).
- Page mode interleaved memory architecture.
- LIM 4.0 support for memory over 640 KB.
- Integrated diskette and high performance 16-bit VGA video controller on system board.
- Socket for Intel 80287 math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Integrated high peformance hard disk interface on system board.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 3 full-sized 16-bit AT expansion slots available.
- 12-month On-Site Service Contract provided by Xerox.△

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| 20 MB VGA Color Plus System | $1,899 |
| 40 MB VGA Monochrome System | $1,799 |
| 40 MB VGA Color Plus System | $2,099 |

Prices listed reflect 512 KB of RAM. 640 KB versions of the above systems are available for an additional $50, 1 MB versions for an additional $150, and 2 MB versions for an additional $300.
80 and 100 MB hard drive configurations also available.

## THE DELL SYSTEM® 325 25 MHz 386.

An even better value at these low prices.

STANDARD FEATURES:

- Intel 80386 microprocessor running at 25 MHz.
- Standard 1 MB of RAM, optional 2 MB or 4 MB of RAM* expandable to 16 MB (using a dedicated high speed 32-bit memory slot).
- Advanced Intel 82385 Cache Memory Controller with 32 KB of high speed static RAM cache.
- Page mode interleaved memory architecture.
- VGA systems include a high performance 16-bit video adapter.
- Socket for 25 MHz Intel 80387 or 25 MHz WEITEK 3167 math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Dual diskette and hard drive controller.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 200-watt power supply.
- 8 industry standard expansion slots (6 available).
- 12-month On-Site Service Contract provided by Xerox.△

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| | |
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| 40 MB VGA Monochrome System | $3,999 |
| 100 MB VGA Color Plus System | $4,899 |
| 100 MB Super VGA Color System (800x600) | $4,999 |
| 150 MB Super VGA Color System (800x600) | $5,499 |

Prices listed reflect 1 MB of RAM. 80, 150 and 322 MB hard drive configurations also available.

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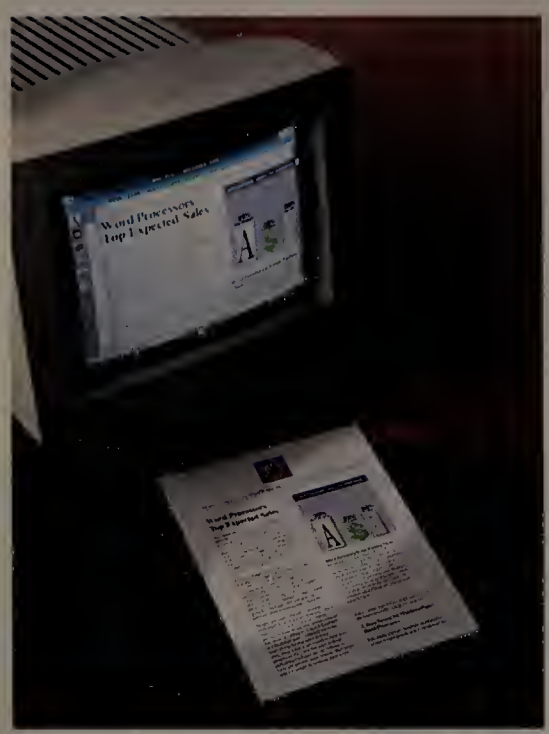

Cover story: The Best Buys in word processing make the most of Windows' easy-to-learn graphical interface, page 104.

*Cover photograph by Fred Stimson*

## PREVIEWS


74 **Wingz Soars Into the OS/2 Picture**
*Evelyn Morrison*
Spreadsheet users who switch to OS/2 face an embarrassment of riches as the visually dazzling *Wingz* joins *Excel* and *1-2-3/G* in the PM lineup.

80 **SX Machines Turn Up the Clock** *Lincoln Spector*
Two top system makers react fast after Intel cranks the 80386SX up to 20 MHz—Dell with a quick upgrade, NCR with an elegant new design.


## REVIEWS


104 **Picture-Perfect Word Processing** *George Campbell*
Yes, they're slow. But *Ami Professional* and *Word for Windows* put desktop publishing strength in smart-looking, intuitive packages.

112 **PostScript the Hard Way** *Richard Jantz*
The *easy* way to get crisp PostScript output is to spring for a $6000 LaserWriter. If money matters more than speed, here are five bargain alternatives.

117 **PostScript Clones Survive the Compatibility Torture Test**
A handful of files even the LaserWriter couldn't handle.

118 **Solving the PostScript Equation—The True Cost of Emulators**
Add the hidden hardware costs, and where's the bargain?

124 **Winning Colors** *Wes Nihei*
Colorful graphics help presentations stand out in front of a crowd. Best Buy printers from HP and QMS make color output easy and affordable.

129 **Why Your Favorite Software Isn't Color-Blind Anymore**
Thanks to PostScript, color printers are a safe buy.


## NEWS


11 **Top of the News**
*Mike Hogan*
Late-breaking news you can use.

63 **Industry Outlook**
*Edited by Eric Bender*
- How are system makers coping with the slowdown in PC growth?
- HP's ink jets are quietly overrunning the dot matrix market
- Designed for salespeople, contact-management software is finding a home on laptops
- UNIX vendors press for success as OS/2 developers struggle
- Next gets a crucial boost—but can IBM save Steve Jobs?

84 **Product Outlook**
*Edited by Mike Hogan*
- Toshiba's notable notebooks combine light weight, sharp screens
- Acer, AST roll out EISA systems to stand out in the 486 crowd
- PostScript or LaserJet? With Kyocera's Q-8010, you get both
- A 33-MHz 386 upgrade board can soup up that old PS/2
- Tandon builds a line of powerful 486 desktops with EISA slots
- *Enable*'s $199 junior partner is ideal for small business
- *Faxit* lets you broadcast sharp faxes from inside *Windows*
- The Regal SX transportable—feature rich but affordable
- TI's latest laser does PostScript at half the usual price

94 **Update**
- *PFS: First Publisher 3.0*
- *Clarion Professional Developer 2.1, Clarion Report Writer*
- *DOS Partner 1.1*
- *PowerBASIC 2.0*

# CONTENTS

May 1990
Volume 8, Number 5

134 **Smart Monitors, Smart Buys** *TJ Byers*
Once a luxury, the multiscan is now nearly indispensable. The good news: One of our three Best Buys costs less than most plain VGA monitors.

## FEATURE

174 **Buyers' Guide: Look Sharp With a Super-VGA Board** *Eric Knorr and Matt Lake*
Video boards for every taste and budget—nearly four dozen of them—with the emphasis on extra-sharp super-VGA modes for *Windows* and PM.

## HOW TO

182 **The Do-It-Yourself BBS** *Judy Getts*
Setting up your own electronic bulletin board system doesn't have to be a hassle. *Maxihost*, a versatile shareware program, makes it easy.

186 **User Group Tips**
Hands-on advice from users across the nation.

189 **Spreadsheets (A..Z)** *Richard Scoville*
Spruce up your worksheets with *Allways* and *Impress*.

195 **Words Into Print** *George Campbell*
Newspaper-style columns give pages impact and readability.

201 **Data Basics** *Alan Schwartz*
A relational primer, a *dBASE* editor, and a *Paradox* trick.

207 **The Art of Persuasion** *Richard Jantz*
A little white space goes a long way toward easier-reading pages.

## SPECIAL REPORT

**WINDOWS**
**A PC World Supplement on Windowing Environments and Applications**
*Edited by Robert Luhn*

151 **FEATURE**
**Windows on the Corporation**
Will corporations hook their PCs, minis, and mainframes together using the OS/2 Presentation Manager or *Windows?* IBM and HP are banking that their *OfficeVision* and *NewWave Office* will make these connections.

157 **PREVIEWS**
**Thinx** The next step beyond spreadsheets?
**Unicom 1.4** Shareware communications for *Windows*

160 **REVIEWS**
**FrameMaker 2.0** Everything *Ventura Publisher* does and more
**Current 1.0** A flexible, manageable personal information manager
**AutoCAD Release 10 for OS/2** Powerful (but slow) drafting for professionals
**Twindows 1.0** A *1-2-3* clone for *Windows?*
**Infomark Express 1.1** The manager's market analyst

## PERSPECTIVES

15 **Richard Landry**
Font war or phony war?

23 **Letters**
One reader's dark interpretation of IBM's Micro Channel strategy.

## DEPARTMENTS

6 **In This Issue**
The who and why behind *PC World*'s all-new How To section.

39 **The Help Screen**
*Karl Koessel*
The straight and narrow upgrade path, plus a hard disk primer.

51 **Consumer Watch**
*Roberta Furger*
When you pay for it with plastic, you've got the law on your side.

213 **Star-Dot-Star**
*Edited by Tom Swan*
A fast Pascal alternative to CHKDSK; three must-have developers' tools from Borland.

219 **Network Q&A**
*David Ferris*
The best of both worlds—smart ways to connect PCs and Macs.

264 **Taking It Home**
*Lawrence J. Magid*
PCs don't have to be noisy. Check out some low-decibel upgrades.

224 **PC World Catalog**
A convenient buying guide to PC products and services.

244 **Advertisers Index**

245 **Products Featured in Editorial**
More information for *PC World* readers.

247 **PC World Computer Products Shopping Guide**
A handy mail-order shopping guide.

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*Editor in Chief*

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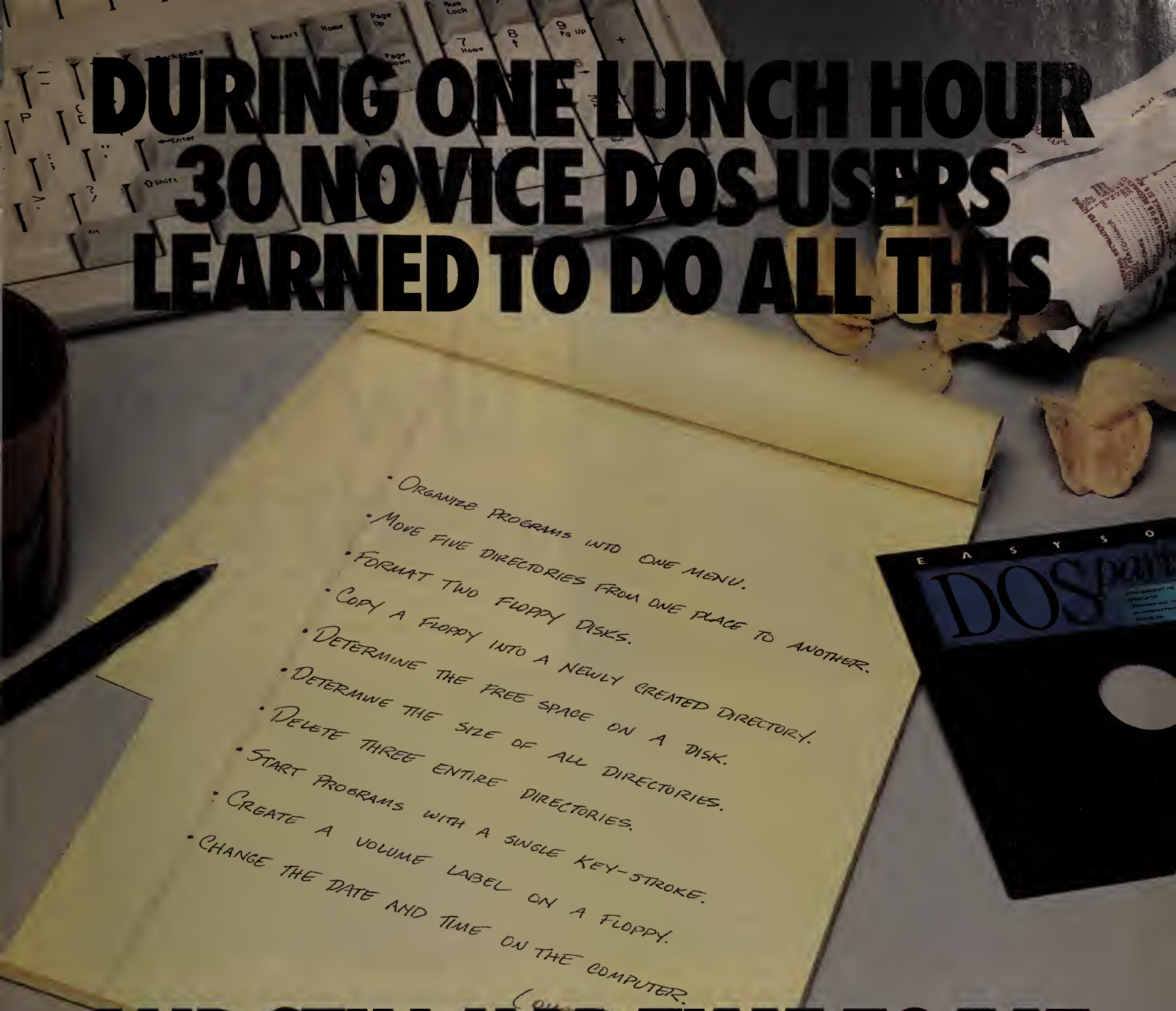


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**D O S P A R T N E R**

Circle 64 on reader service card

# The All-New How To

**Senior Editor Robert Luhn had a busy month.**

ROBERT CARDIN

If you dusted this magazine for fingerprints, you'd find Robert Luhn's all over it.

For starters, there's a brand-new installment in our series of quarterly *Windows* Special Reports. Luhn, a seven-year *PC World* veteran and one of three senior editors, has headed up *Windows* coverage since the supplement debuted in January 1989. Normally, editing a feature article, two previews, and five reviews of sophisticated new applications for *Windows*, OS/2, and the Next system would qualify as a superhuman work load.

But this month Luhn also orchestrated a complete make-over of our How To section. Beginning with this issue, we'll put even greater emphasis on helping you squeeze more value out of the PC technology you already own. In the first stage, on display in these pages, we introduce four monthly columns. A fifth column will debut next month, along with our new back-page feature, *PC World*'s *Instant Reference Card*.

Why the refurbishing? "You could call it a guarantee," Luhn says. "Our new columns target the five application areas that define business computing today. That means every month we'll have pertinent information about the applications most of us use every day."

The authors are longtime *PC World* contributors—George Campbell delivers word processing expertise, Richard Scoville has advice for spreadsheet users, Alan Schwartz tackles data base management, and Richard Jantz helps you master desktop publishing and presentations. (You'll have to wait till next month for the first installment of Judy Getts's on-line communications column.) *Pertinent* is the watchword for all the new columns, says Luhn. "And these columnists are senior practitioners in their application areas—most are book authors as well. They know how to provide information you can use—and keep using."

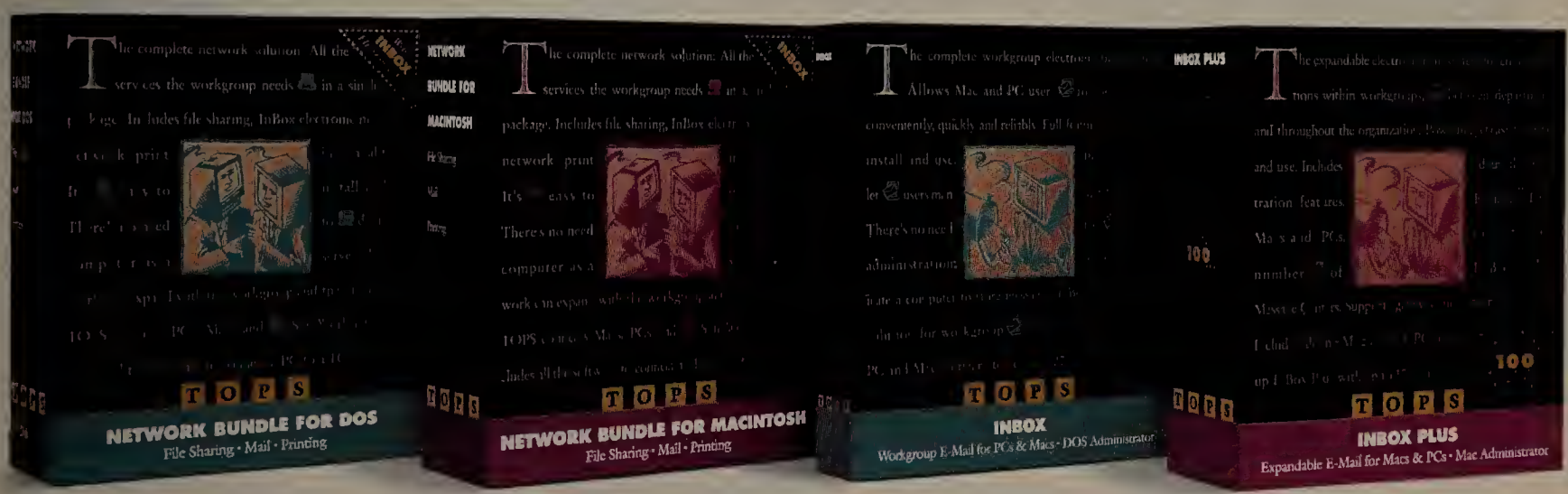
The icing on the How To cake is our tear-out *Instant Reference Card*, an example-packed desk accessory that should fill the gap between terse keyboard templates and bulky manuals. "The card is the ultimate representation of what we're trying to accomplish with the How To section," Luhn reports. "Most DOS applications are just not intuitive enough for people to remember. And who has the time to plow through the manual every time you forget a command?"

The How To features are designed to help raise general skill levels, Luhn explains, "but they're not just for beginners. The typical *PC World* reader qualifies as an expert—in at least one application. Still, all of us can use some help getting around in less familiar territory." ●

Ed Bott

*Ed Bott*
*Managing Editor*

# Four reasons why 1990 will be the year of the workgroup.

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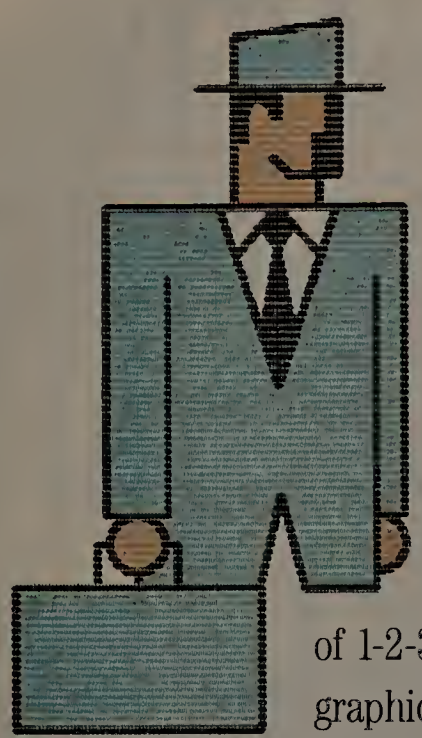
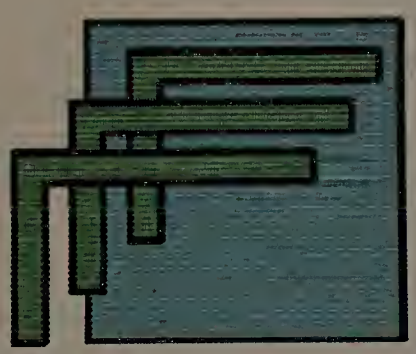
# Introducing 1-2-3/G. The that doesn't have to



A dazzling screen is merely the beginning with new Lotus® 1-2-3/G.™

It's the only graphical spreadsheet that gives you the power and familiarity of 1-2-3.® Along with an advanced graphical interface that redefines the term "easy-to-use." Its impressive array of features will let you get your work done better, faster and easier. In ways that have *PC World* calling it "a new high in spreadsheet technology."

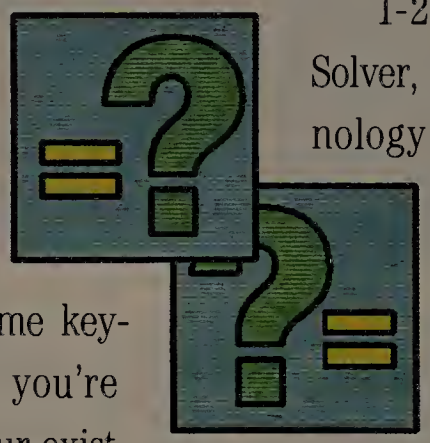
And if you're one of the ten million people who know how to use Lotus 1-2-3, you already know how to use 1-2-3/G. Because it works with the same keyboard commands you're using now. And your existing 1-2-3 data, macros and files are all compatible. Just retrieve them, and go to work.



Once you do, you'll start working better almost immediately. To start with, 1-2-3/G gives you true 3D worksheets that make organization, navigation and formatting incredibly easy. And help you do complex analyses, so you can create models that more closely reflect the three-dimensional world you work in.

You can link your data across files. Making the integration of critical data from several files, even across networks, simpler than you've ever thought possible.

And 1-2-3/G can act as a powerful front-end to major databases. Because it lets you access data directly from outside sources without ever leaving your spreadsheet, to help increase your productivity.



1-2-3/G also introduces you to Solver, an advanced goal-seeking technology that gives you an amazingly quick way to solve complex "what if" problems that have multiple variables. You define the parameters, and Solver will show you "how to" achieve the result you want. It presents you with a number of alternative solutions, even pointing out the best one. So, for example, you can find the right sales mix to optimize your profit margins, and completely skip the tedious

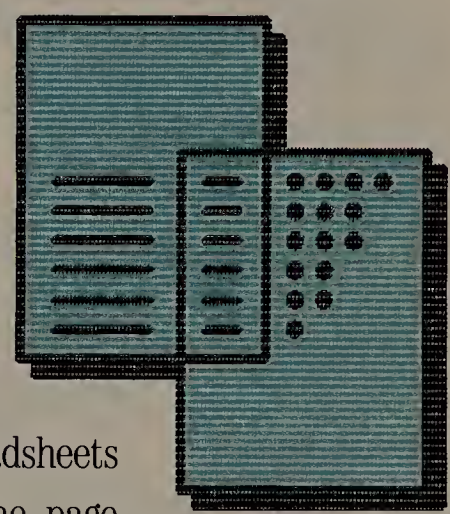
# first graphical spreadsheet get by on looks alone.

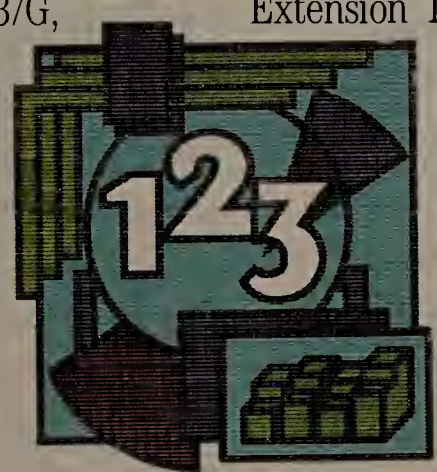
trial and error process you'd normally go through.

There's never been a graphical user interface as easy to use as the one you'll find in 1-2-3/G. It gives you the flexibility of working with the keyboard, the mouse, or both. Which makes the path from character-based computing to graphical computing a smooth one. While giving you the freedom to work in the way that's most comfortable and efficient for you.

You can create collections that let you work with a number of ranges, simultaneously, as easily as you now work with a single range. Saving you both time and repetitive steps. And with unique palettes and previews in dialog boxes, 1-2-3/G goes beyond what-you-see-is-what-you-get. It gives you an upfront what-you-see-*before*-you-get-it look at options before you execute them.

With Lotus 1-2-3/G, you'll be able to create more dramatic, more attention-getting graphs that communicate your information better. With the ability to move elements directly on the screen, customization is incredibly easy. And it's simple to get the graph you want, even 3D bar charts and mixed chart types, by choosing from the graph gallery's selection. For persuasive, presentation-quality reports, 1-2-3/G also lets you combine spreadsheets and graphs on the same page.






And because 1-2-3/G was specifically designed for OS/2,® it takes full advantage of that platform's speed, large memory and multi-tasking abilities. Along with its application integration ability, that lets you share data between Lotus 1-2-3/G and other OS/2 programs. So, all together, you'll be sure to get the most from your OS/2 investment.

But the best way to understand what 1-2-3/G can do is to experience it for yourself. Just call **1-800-TRADE UP,** Extension 172, and we'll send you a free auto-demo.* Or, if you're already convinced, ask for the Upgrade Order Pack instead. And start using the graphical spreadsheet that has a lot more going for it than just a pretty screen.

## New Lotus 1-2-3/G

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## SPA Confronts Pirates

*Software Publishers Are Mad as Hell and Ready to Sue Over Illegal Copies*

If your company has unauthorized copies of software, you may be asked to open your hard disks to inspection by the Software Publishers Association (SPA) within 48 hours or face a lawsuit. The 609-member organization is stepping up efforts against piracy with airline commercials, letters to chief executives offering a choice of disk audit or lawsuit, and a toll-free hot line for turning in miscreants. In the past 18 months, SPA collected more than $500,000 in settlements from 34 companies unable to provide the necessary purchase records. Those firms had to destroy the purloined software, contribute its full retail value to the SPA enforcement fund, and buy new copies—thus paying double for software. Fines generally range between $25,000 and $50,000, but some have exceeded $100,000, reports SPA general counsel Mary Jane Saunders. "We insist on the two-for-one penalty payment because an important principle is involved," she adds. "Otherwise people would just use software until they got caught." While agreeing with the principle, Micro Manager Association board member Stephen Rood points out that it's often difficult to match software installations to purchase orders. But Saunders responds that SPA has easily demonstrated systematic piracy in the companies targeted; SPA gets 20 piracy reports a day, mostly from disgruntled employees, on its 800/388-7478 toll-free line. SPA self-audit kits also are available through that number.

## IBM Products Released

*IBM Touts Expandability of Floor-Standing PS/2 Models; Baby Laser Attacks LaserJet IIP*

IBM has revamped its line of floor-standing PS/2s and also introduced a personal laser printer that should prove a worthy contender against Hewlett-Packard's LaserJet IIP. The new PS/2s range from a 386SX-based Model 65 SX, which costs $5295 with 2MB of memory and a 23ms 60MB drive, to a 25-MHz 80386-based Model 80 priced at $13,195 with 4MB of memory and a fast 12.5ms 320MB drive. Instead of raw processing power, Big Blue is pushing expandability: The machines offer seven free slots and up to six bays that can accept more than 1.2GB of storage. The long-awaited SCSI Micro Channel bus master adapter comes standard; it boosts disk throughput and offers connections to third-party SCSI devices. IBM is positioning all of these machines as PS/2-based network servers. None comes close to Compaq's Systempro in processing power, but one that does—a 486-based prototype that IBM has been showing for months—was absent from the announcement. Meanwhile, IBM started playing hardball with HP by introducing the LaserPrinter E, a compact desktop unit that matches the LaserJet IIP's $1495 list price and, at 5 pages per minute, is 25 percent faster. It can be upgraded to 10 ppm for $1099 more. For $948 above the base price, the LaserPrinter E can be turned into a $2443 PostScript printer. Completing a busy day, IBM announced shipment of the Presentation Manager version of OS/2 Extended Edition with its multiuser SQL engine and of the OS/2 network software, *LAN Server 1.2*.

## Font Plans Revealed

*Standards Battle Looms as IBM/Adobe, Microsoft/Apple, and Hewlett-Packard Stake Out Turf*

The three major camps creating scalable type fonts for *Windows* and OS/2 revealed more of their plans at Seybold's publishing conference in March, but the issue of which standards will prevail is by no means decided. IBM parted ways with frequent partner Microsoft by licensing Adobe's PostScript Type 1 font technology for OS/2 and other strategic platforms. The decision reflects customer investment in PostScript and IBM's plans for "view-and-print-anywhere" capabilities throughout its major product lines. However, Microsoft's OS/2 solution is TrueType, a part of the TrueImage page description language being developed with Apple. A similar PostScript-versus-TrueType battle is shaping up over *Windows*, with Microsoft reporting that it may get TrueType into *Windows* as early as year's end. Adobe is expected to launch a PostScript-based rival long before that—when *Windows 3* arrives. Meanwhile, Hewlett-Packard's new LaserJet III includes a third alternative based on Agfa Compugraphics's Intellifonts. This approach is not as ambitious technically as TrueType or PostScript, but it still meets most PC users' needs and will benefit from HP's laser printer marketing muscle. HP is creating software that will install Intellifonts for OS/2 and *Windows*.

## Multiprocessing Goes Modular

*Start-Up Manufacturers Developing DOS, OS/2 Multiprocessor Solutions You Can Ease Into*

Two Silicon Valley start-ups are developing subsystems that will let you buy a single-CPU computer and add up to three processors as you need them. NexGen Microsystems, partially funded by Compaq Computer, is working on a new CPU and a new bus architecture to be offered to system makers and sold to end users in NexGen's own four-CPU system—perhaps by year's end. Next month, S3 will introduce separate CPU, memory, and I/O subsystems that also let PC makers produce modular and easily upgraded systems. Both S3 and NexGen build supersets of the connection between the CPU and the I/O bus, enabling system makers to attach ISA, EISA, or Micro Channel buses more cheaply and with improved performance. Both insist they will run off-the-shelf OS/2 and DOS software. But while S3 initially will use Intel 386 and 486 processors, to which a Reduced Instruction Set Computing (RISC) processor can be added later, NexGen uses its own chip, a partial RISC processor that the company claims will be twice as fast as a given clock speed of any Intel chip. Vice President of Marketing Peter Janssen insists that NexGen can achieve software compatibility without licensing or reverse-engineering Intel designs. Both vendors would benefit from a future version of OS/2 that will run applications on multiple CPUs. Currently in the PC world, only UNIX can control multiple processors, although both Compaq and Novell have announced multi-processing versions of LAN operating systems.

## New DisplayWrite Debuts

*Word Processor Shows Surprising Market Strength*

IBM Desktop Software has rolled out a new version of *DisplayWrite*, a program that has quietly ranked third or fourth in PC word processor sales in recent years. *DisplayWrite 5 for DOS* boasts 35 new features including a command line interface, better file-handling capabilities, a page preview, improved mail merge and file import functions, and split-screen editing of two documents with cut and paste between them. International Data Corporation (IDC) estimates that *DisplayWrite*'s installed base of 800,000 was about equal to *Microsoft Word*'s last year, trailing *WordPerfect*'s 4 million and *WordStar*'s 3 million. But *DisplayWrite* gets far less respect, says IDC analyst Nancy McSharry, because its features haven't matched up well with the others. It enjoys high sales but a low retail profile, she adds, because "75 percent of the product is sold through IBM's own potent direct-sales force." Product Marketing Manager Randy Hujar denies that *DisplayWrite* is being buoyed up and insists that most U.S. sales go through resellers. Recent agreements with Softsel and Ingram/Micro D will broaden distribution, and the new features may help boost sales. *DisplayWrite* comes in three $495 versions aimed at different audiences: *DisplayWrite 5/2* for OS/2 with a page-composition option, version 4.2 for 8086-based systems, and *DisplayWrite 5* for hardware at and above the 286 level.

## Kaypro Files Chapter 11

*Declining Sales, Financial Troubles Take Their Toll*

Kaypro Corporation, one of the last survivors from the days of CP/M-based computing, has sought Chapter 11 protection from its creditors. Long plagued by declining market share, an eroding dealer base, and component problems, the Solana Beach, California, company ended the last three years in the red. Sales plummeted from $72 million in 1988 to $21.8 million in 1989, and Kaypro lost more than $19 million. A key component of the reorganization plan will be an effort to increase the number and quality of its dealers. Their number eroded from 1100 to several hundred because of poor support, admits new chief executive Roy Salisbury. "As a firm gets into trouble, you look for places to cut, and one of the first places to look is service and support." Salisbury brought in his own management team in February. No members of the Kay family are involved in day-to-day management, although founder Andrew Kay remains chairman of the board. Salisbury promises several new products beyond the just-introduced 386SX system and vows to help dealers provide better support to the 500,000 Kaypro users. But many observers are skeptical about his ability to turn things around. "There are a number of hurdles they'll have to overcome," says IDC analyst Bruce Stephen. "They seem almost insurmountable." ●

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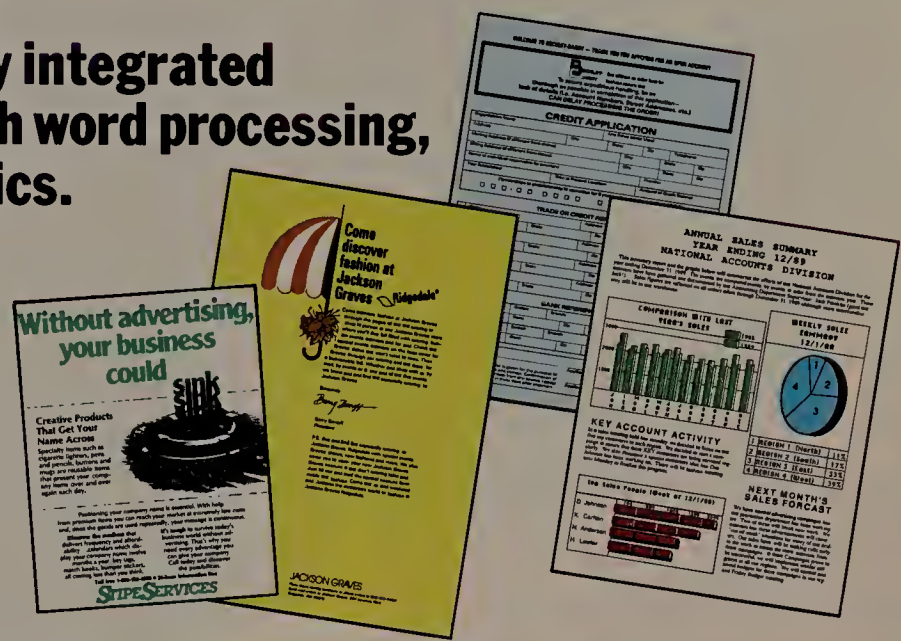


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*Richard Landry*

FRED STIMSON

# Font Wars, Part II: The Battle for Your Desktop

**Fonts aren't just for desktop publishing anymore.**

**As the latest round of industry battles shows, fonts are becoming part of tomorrow's PC standard.**

"I don't know if I'm at a publishing conference or a computer conference," complained one voice at the Seybold seminar on professional publishing recently. That's where IBM announced its decision to provide Adobe PostScript font technology in the software that powers most of its systems, including OS/2's Presentation Manager (see *Top of the News* in this issue). Microsoft made news there too, taking the wraps off plans for its own page description language and font manager, which it had announced about six months earlier at another Seybold conference. (See "Now It's—Font Wars!" *Richard Landry,* November 1989.)

Once upon a time, only desktop publishers worried about fonts or about page description languages—the software that translates complex type and graphics formats into commands a printer understands. Those days are gone forever. Today's leading word processors have the desktop publishing power to create attractive business documents—witness our review of three top *Windows* word processors in this issue. Other products like *Excel, Quattro Pro,* and even *1-2-3* with *Allways* show that fonts and graphics can give a new twist to any form of business information.

**But It's No Picnic** Unfortunately, today's font-and-graphics technologies don't have what it takes to win over most PC users. PostScript is the big leader, boasting support from most PC software packages. But PostScript printers are slower and more expensive than garden-variety LaserJets, thanks to PostScript's big appetite for printer horsepower and Adobe's high-priced licenses. Font-creation programs like Bitstream's *Fontware* and Hewlett-Packard's *Type Director* can give a LaserJet some of PostScript's pizzazz, but they take a lot of time to set up and they consume huge amounts of hard disk space, too. PostScript cartridges and clone software are price-conscious alternatives, but speed and compatibility issues can trip you up. (See "PostScript the Hard Way" in this issue.)

IBM and Microsoft are banking on the next generation of PC software to solve some of these problems. With font and printer controls built right into *Windows* and Presentation Manager, it will be possible to create high-impact documents and spreadsheets without a lot of advance preparation or hassle. We'll be able to share information more easily among co-workers too, despite differences in the kinds of systems or software we happen to be using. Maybe even more important, programmers will take advantage of typography and graphics to make tomorrow's PC programs easier to use. Correct use of typography will become part of the programmer's craft, just like it's part of the successful desktop publisher's bag of tricks.

Still, there's one thing wrong with this rosy picture: IBM wants to go with the proven standard in Adobe PostScript; Microsoft, meanwhile, has teamed up with Apple to create what it believes is a better version of PostScript, with font technology that gives vendors new ways to make typography flexible, inexpensive, and easy to use. For the moment, neither side seems willing to budge on the issue, so this difference of opinion has all the makings of a full-blown battle over the future of PC software.

*(continues)*

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| 76 MB VGA mono system | $3,561 |
| 76 MB VGA color system | $3,891 |

**Model AT316S-6**
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- 1.2 MB or 1.44 MB Floppy Drive
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- MS DOS (choose 3.3 or 4.01)
- Integrated Floppy Controller
- Memory Management Software

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| Base system: | $1,458 |
| 40 MB VGA mono system | $2,169 |
| 40 MB VGA color system | $2,499 |
| 100 MB VGA mono system | $2,586 |
| 100 MB VGA color system | $2,916 |

**Model AT216-6**
80286 16Mhz

- Industry Standard Architecture
- 1 MB RAM expandable to 8 MB on CPU Board
- 1.2 MB or 1.44 MB Floppy Drive
- 101-Key Enhanced Keyboard
- MS DOS (choose 3.3 or 4.01)
- Integrated Floppy Controller
- Memory Management Software

| | |
|---|---|
| Base system: | $1,263 |
| 20 MB VGA mono system | $1,863 |
| 20 MB VGA color system | $2,193 |
| 40 MB VGA mono system | $1,974 |
| 40 MB VGA color system | $2,304 |

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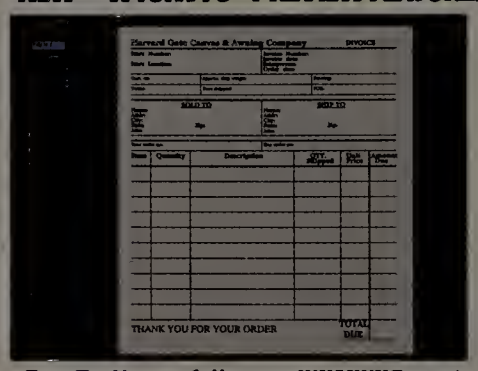

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**RICHARD LANDRY**


**A Phony Font War?** In one respect the font war doesn't amount to much. All sides have retreated to work on the software they promised to ship, and when the contenders finally come out swinging in late 1990, much of the pre-fight rhetoric will seem irrelevant. No doubt, Microsoft will make sure its page description software is compatible with PostScript; meanwhile, Adobe will no doubt make its type technology simpler and less dependent on costly hardware. And IBM has promised to support all comers in the font wars, including HP's low-cost offering for the LaserJet family, Intellifont. So, will the font wars of 1990 seem in retrospect to be more posturing than fisticuffs? Let's hope so.

**Welcome USSR to the PC World** PC technology seems to move a lot faster than the world in general—but that's not always the case. For example, this issue marks the first time that the United States version of *PC World* will be officially distributed in the Soviet Union. *PC World* already has a Soviet sibling that gets enthusiastic raves from newsstand buyers in Moscow and elsewhere. But now Soviet readers will have access to the U.S. *PC World* too, along with other magazines like *Rolling Stone* and *Hot Rod*. *PC World* welcomes its Soviet readers and the many others from Eastern bloc countries who have written to us recently. We're glad you can join us.

As always, I'm interested in your opinions on this or any other subject. Write to me at *PC World*, 501 Second St., San Francisco, CA 94107; fax 415/442-1891; MCI Mail Richard Landry/301-3685. ●

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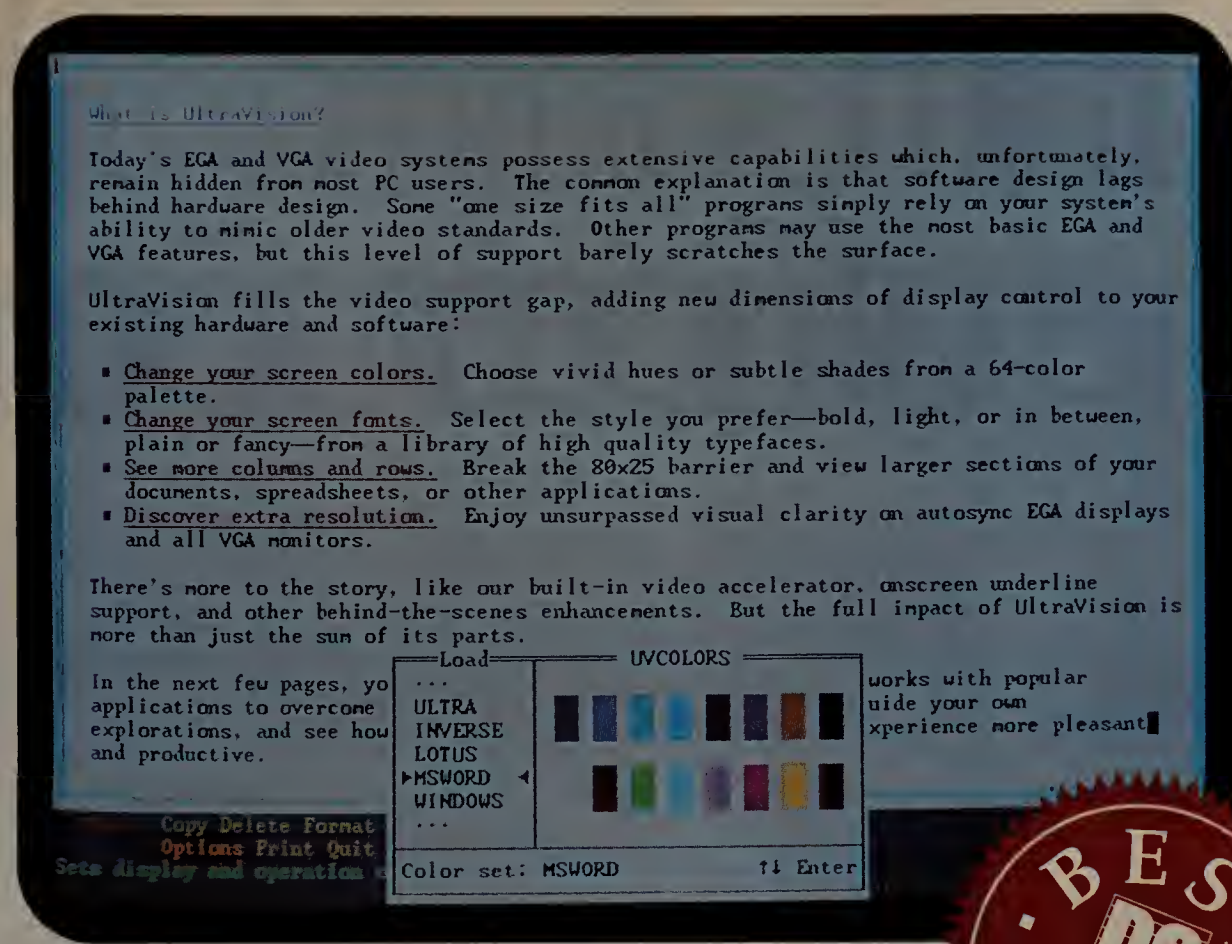


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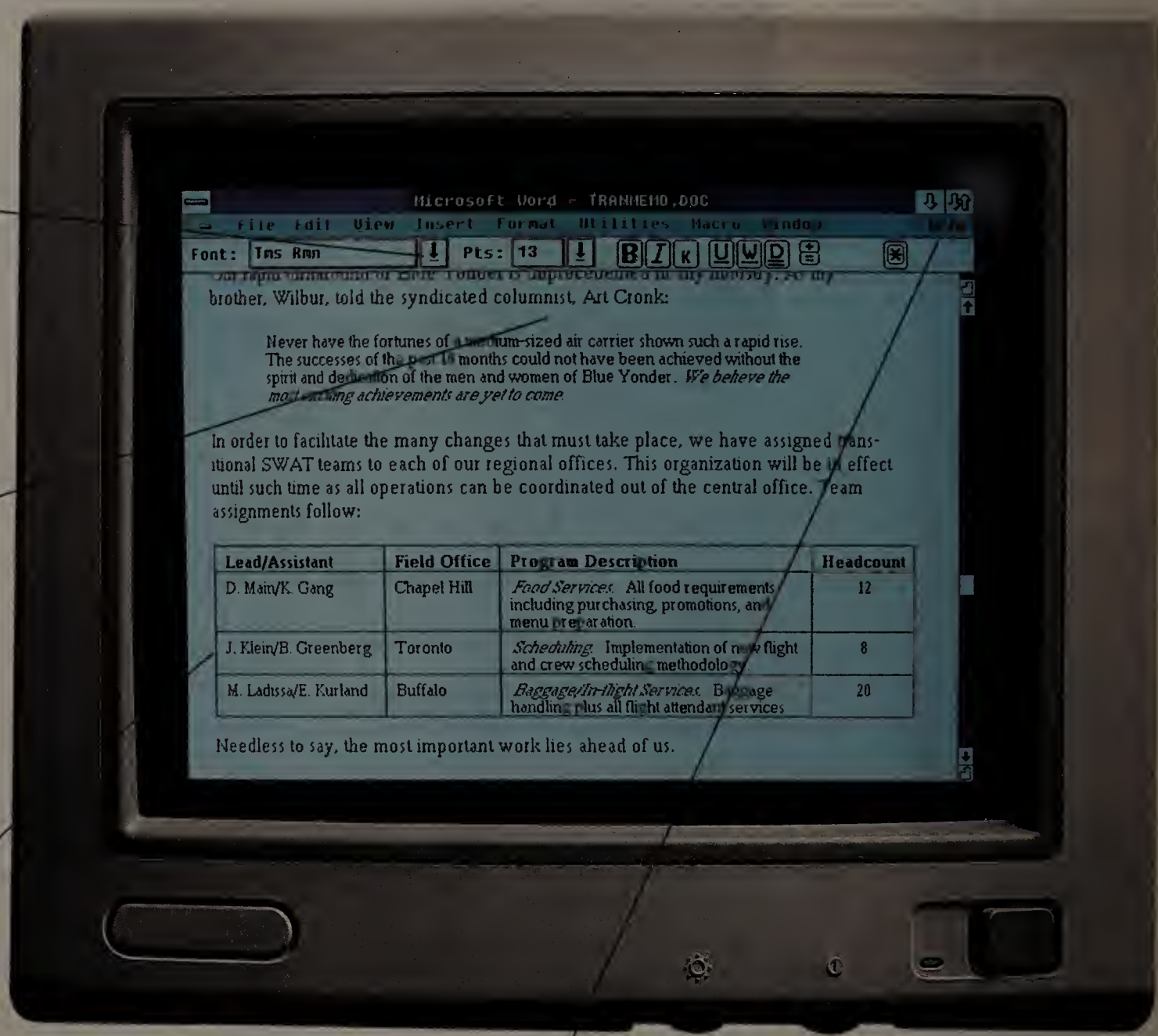


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*Intuitive icons on the Ribbon make those everyday tasks, like formatting, as easy as ABC. Or, more precisely, see, point, do.*

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Chances are, those simple, everyday memos you've been creating aren't so simple to create anymore. What with the time-consuming process of messing with formatted paragraphs, typefaces, and tables.

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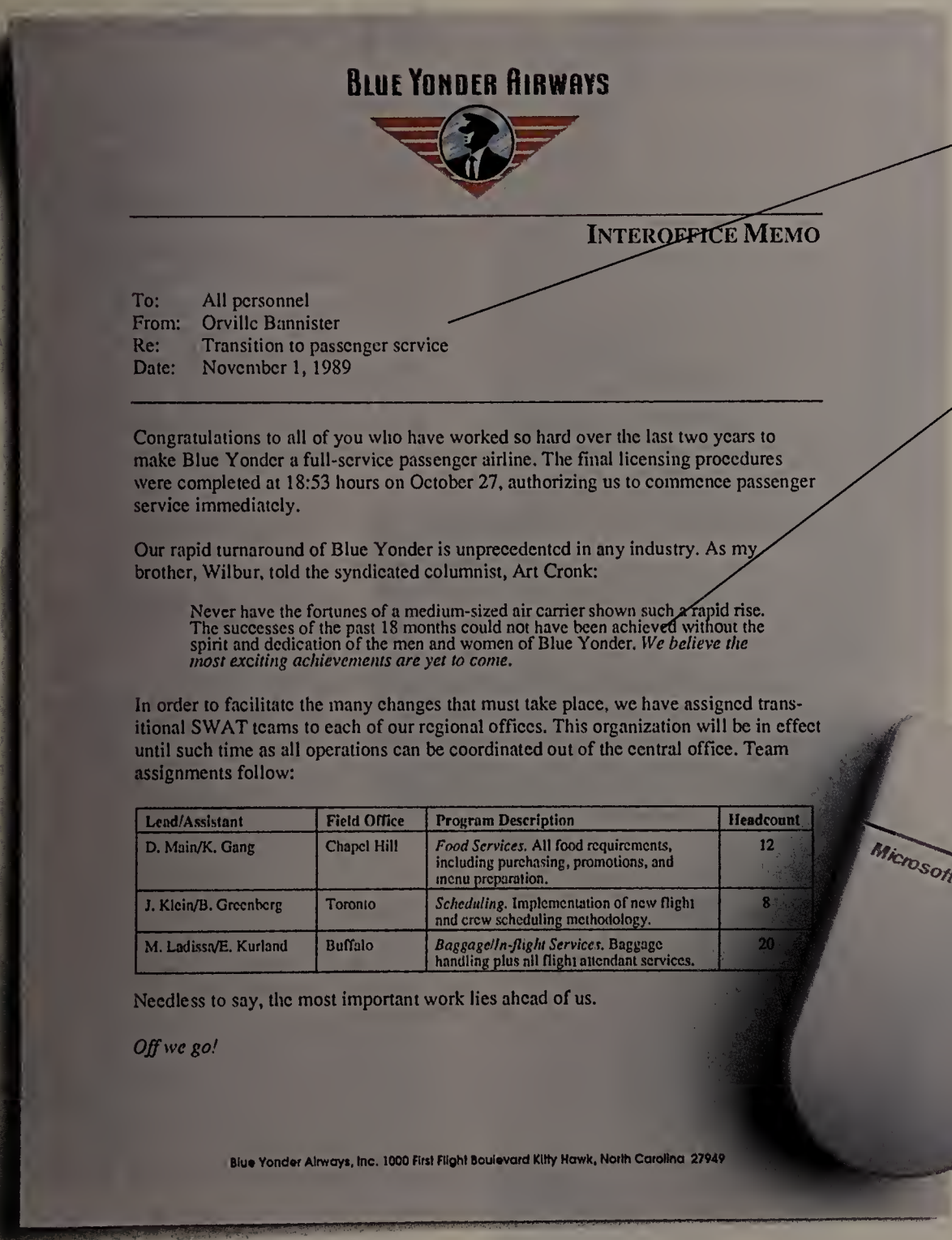

BLUE YONDER AIRWAYS

INTEROFFICE MEMO

To: All personnel
From: Orville Bannister
Re: Transition to passenger service
Date: November 1, 1989

Congratulations to all of you who have worked so hard over the last two years to make Blue Yonder a full-service passenger airline. The final licensing procedures were completed at 18:53 hours on October 27, authorizing us to commence passenger service immediately.

Our rapid turnaround of Blue Yonder is unprecedented in any industry. As my brother, Wilbur, told the syndicated columnist, Art Cronk:

> Never have the fortunes of a medium-sized air carrier shown such a rapid rise. The successes of the past 18 months could not have been achieved without the spirit and dedication of the men and women of Blue Yonder. *We believe the most exciting achievements are yet to come.*

In order to facilitate the many changes that must take place, we have assigned transitional SWAT teams to each of our regional offices. This organization will be in effect until such time as all operations can be coordinated out of the central office. Team assignments follow:

| Lead/Assistant | Field Office | Program Description | Headcount |
|---|---|---|---|
| D. Main/K. Gang | Chapel Hill | *Food Services.* All food requirements, including purchasing, promotions, and menu preparation. | 12 |
| J. Klein/B. Greenberg | Toronto | *Scheduling.* Implementation of new flight and crew scheduling methodology. | 8 |
| M. Ladissa/E. Kurland | Buffalo | *Baggage/In-flight Services.* Baggage handling plus all flight attendant services. | 20 |

Needless to say, the most important work lies ahead of us.

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In addition, Word for Windows allows you to make the quantum leap into graphical word processing without losing the equity you have in your current program. It reads and writes files from virtually all word processing applications.

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# LETTERS

**Reactions and responses from the PC World community**

### Bus Busters

A better title for your EISA sidebar [January 1990] might have been "Can EISA Live Up to IBM's Marketing?" I'm convinced the difference between MCA and EISA has little to do with technology. IBM has been trying to regain dominance by selling MCA on the basis of its future benefits—a tactic for inhibiting competing sales. Authors Michael Goodwin and Karl Koessel give us a clue when they write, "So far, MCA hasn't delivered on its bus-master potential, partly because IBM has provided little support for board designers until recently." Apparently IBM had no intention of doing so until forced to by the advent of EISA.

I consider IBM to be a company that puts its efforts into selling products rather than developing them. I have refused to pay their premium in the past, and I am not about to buy into their proprietary vision now.

*James H. Duncan*
*Big Bear City, California*

BUD PEEN

### No-Haggle Discounts

Who on earth would pay $10,000 for a 386 when they could get an identically configured machine for $5300? Your February review of 33-MHz 386s, like most reviews in this and other magazines, gives readers the wrong impression about prices.

Dealers generally do more than "knock a few dollars off" a ridiculously high price. After reading the review, I called a local dealer to price the same configuration of an Everex Step 386/33 that *PC World* listed at $10,215. Without any wheeling and dealing, he gave me a price of $6752 to $6974 with a non-Everex monitor and graphics board. That's a lot more than "a few dollars."

Reviews that compare products based on list price may be a great service to mail-order houses, but they don't do much for readers.

*Patrick Marshall*
*Washington, D.C.*

### When DOS Won't Do...

With all your reviews of faster hardware, why no mention of UNIX/Xenix operating systems? I resell systems for point-of-sale applications and would never consider DOS for such systems. UNIX is not best for home use, but a hard disk can be partitioned to run DOS *and* UNIX at work to create a more economical multiuser system. How about devoting a small corner to UNIX in the future?

*Richard Shallberg*
*Hillside, Illinois*

### The Right Stuff

In response to Richard Landry's February column ["Personal Workstations or Hobbled PCs?"], I would say that cost savings and productivity gains don't depend on how many jobs a computer can accomplish at one time. Employees usually complete one task before proceeding to the next. Gains are made when they don't have to figure out why the computer isn't working properly. Our main objective is to be a profitable construction company, not to be on the leading edge of technology. Standard computers working at standard speeds have proved to be excellent tools.

*Chris Rowlett*
*Tyler, Texas*

### Money Talk

Thanks for including Parsons' *MoneyCounts* in your February review of personal finance soft-

*(continues)*

ANTHONY RUSSO

# If You Use These...

Let's face it. Although Caere® nearly eliminated EKS (Excessive Key Strokes*) with the introduction of *OmniPage*,™ there are still businesses out there who continue to use slightly *outmoded tools*, seriously limiting the power of their MS-DOS® and Macintosh® computers. Sound familiar?

Now there's a choice. You can enter data using these artifacts of the past, or choose *OmniPage*—which allows you to enter hundreds of pages of data quickly and easily—up to 1500 words per minute. And all for significantly less money than you ever thought possible. You can *choose OmniPage*, or learn to type 25 words per second.

And if that doesn't convince you, consider this: *OmniPage* has just gotten even more powerful, with the addition of a few new family members.

Caere has never been a company to mince words so we developed *OmniSpell*,™ a spellchecker that contains 100,000 words that works with *OmniPage* to correct all of the spelling errors in your scanned documents, even those in the original work—going beyond 100% page recognition to deliver the most accurate scanned text. Working with *OmniPage's* Transitional Editor,™ *OmniSpell* is the only spellchecker designed specifically to work with OCR** software.

With *OmniDraft*,™ draft mode documents don't have to come out looking like electronic alphabet soup. At last, page recognition software that can read output from dot matrix printers—in an instant.

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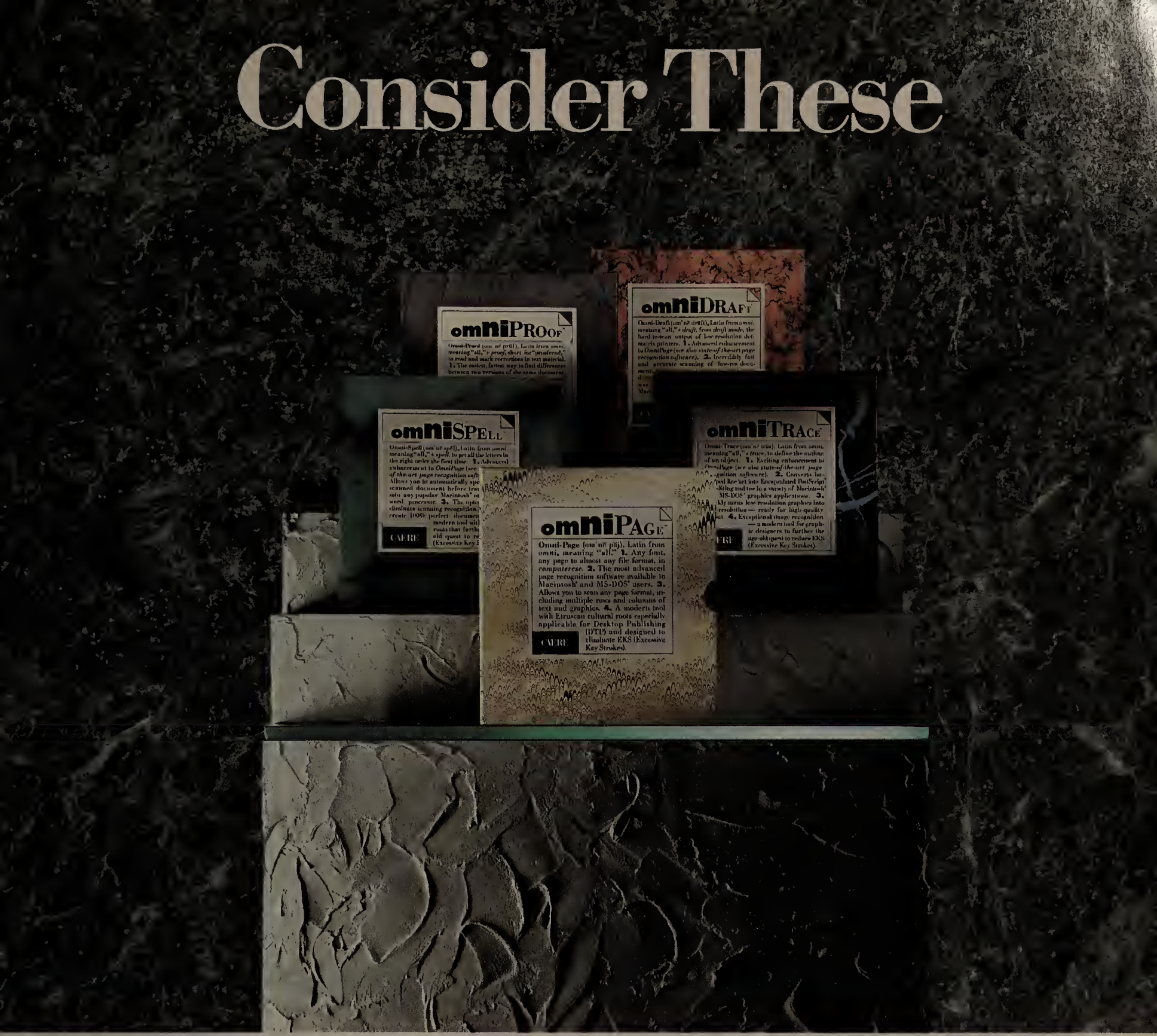


recognize pictures and images the way *OmniPage* lets you scan words—flawlessly. Especially useful for graphic designers, architects and those in business who are concerned with *image*, you can bring any picture into focus. Even complex business forms. Scan black and white images and instantly convert them to PostScript® format for high-res output. Use *OmniTrace's* sophisticated editing tools to refine any shape, curve or line. It's the one software tool from Caere that allows you to put your best image forward.

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**OCR is an abbreviation used by industry experts for *optical character recognition*, an important component of page *recognition*.

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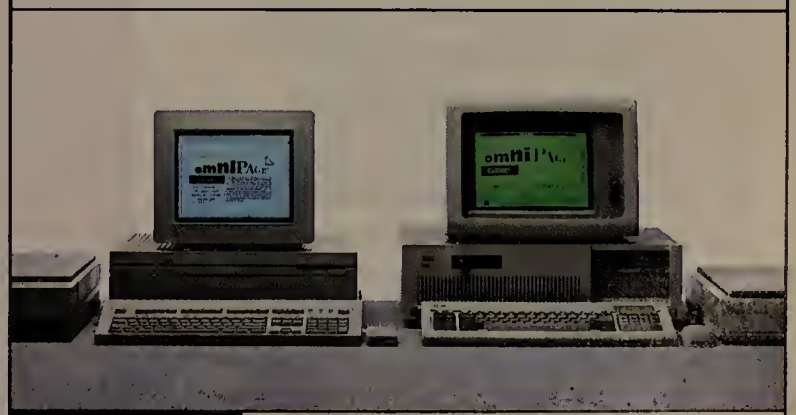

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ware packages. We're glad we stack up so well against the competition.

But why isn't *MoneyCounts* a Best Buy? Of your 30 Features Evaluation areas, *MoneyCounts* fulfills 25, compared to only 16 for *Quicken* and 21 for both *One-Write Plus Money Matters* and *Andrew Tobias' Managing Your Money.*

Moreover, *MoneyCounts* costs $35, compared with the list prices of $59.95 to $219.98 for the other products reviewed.

Every review is subjective, but when one product outperforms the others by the very standards used in the review, and at the best price by far, you've got a best buy.

*Bob Parsons*
*President, Parsons Technology*
*Cedar Rapids, Iowa*

*We make Best Buy determinations not on cost, features, or performance alone but on overall value. The price differences involved were negligible when compared with the main issue of our evaluation: home-business utility. The two Best Buy products accurately target home-business needs.* One-Write Plus Money Matters 1.0 *is easy to set up and use, is flexible, and offers a range of powerful accounting features.* Quicken 3.0 *is fast and accessible and offers outstanding features for check writing and tracking. Giving credit where it's due, we lauded* MoneyCounts' *low price, utilities, and graphics, but we found it didn't measure up to the Best Buy programs in the areas of check writing and ease of use. —Ed.*

**Double-Checking CheckFree**

I felt a small ripple in the force when I read William Rodarmor's sidebar about *CheckFree* in February's roundup of personal finance software. According to my calculations of bank check fees, stationery costs, postage, and the software itself, I would have to write 52 *CheckFree* checks a month to break even. *CheckFree* may be more convenient—I'd even debate that—but for the average user, it's definitely not more economical. Besides, I'm not quite ready to relinquish my money to mere electrons!

*Ray K. Waddell*
*Fayetteville, Georgia*

**Insufficient Memory**

I noted the "advice" from Microsoft and IBM in February's *Industry Outlook*—"choose OS/2 if your machine has more than 2MB of memory and 30MB of storage, and *Windows* if it doesn't." I have 4MB of RAM, and I still get insufficient memory messages when I attempt to transfer data between *Excel* and *Ami.* I have to store items in the Clipboard, close *Excel*, then open *Ami* to insert the data. With only *two* applications running under *Windows*, 4MB barely handles it. Anyone trying to get along in *Windows* with 2MB or less has a big surprise waiting. My advice to potential *Windows* users is to buy RAM, RAM, and more RAM.

*John E. Johnson, Jr.*
*Redwood City, California*

**POWER TIP NO. 99**

**WordPerfect: Between a Hyphen and a Hard Space**

*WordPerfect 5.0* has two handy ways to keep word wrap from splitting a name or a hyphenated phrase at the end of a line. For words separated by spaces, you can insert hard (nonbreaking) spaces by pressing <Home><Space>. For hyphenated phrases, such as *know-it-all,* you can insert nonbreaking hyphens by pressing <Home> with the hyphen key.

*Mark Schwartz*
*New York, New York*

**Error-Free Communications**

Thank you for a generally accurate report on SoftKlone's *Mirror III LAN* [*Product Outlook*, February 1990]. I would, however, like to point out one serious mistake. You state, "In the case of *Mirror III LAN,* you must also dedicate a gateway PC to communications tasks." While this is entirely true, it incorrectly implies that *Procomm Plus Network* does not have the same requirement. Both *Mirror III LAN* and *Procomm Plus Network* can use an asynchronous communications server (ACS) to allow modem sharing. The most common configuration of an ACS requires a dedicated PC to handle communications.

*Keith A. Ackerman*
*Director of Marketing*
*SoftKlone*
*Tallahassee, Florida*

**Correction**

The February 1989 *Product Outlook* item on Nantucket Corporation's *Clipper 5.0* (page 96)

*(continues)*

# Our Foolproof Desktop Tools Make Anyone Look Smart.

***Logitech's foolproof desktop tools let anyone turn out smart looking documents. And now with Logitech's special prices, there's never been a smarter time to buy them.***

***ScanMan® Plus.*** *Scans images up to 4" wide into any document instantly. Works with all major applications. Adjusts to 400 d.p.i., 32 shades of gray, with three photo settings. Suggested Retail Price (SRP): $339.*

***CatchWord™ Intelligent O.C.R.*** *Lets you use text scanned with ScanMan in applications, just as if you'd typed it in. CatchWord accurately recognizes type from 6-20 points in virtually any typeface at speeds of up to 2,000 characters a minute. SRP: $249.*

***Finesse™ Desktop Publishing*** *lets you design brilliant documents effortlessly with direct scanner support, pre-designed page formats and automatic text wraparound. The only inexpensive DTP software to include Bitstream® Fontware™ absolutely free (a $545 value). SRP: $179.*

***Logitech™ Series 9 Mouse.*** *Awarded rave reviews for its comfortable shape, adjustable resolution and ballistic drivers for flick-of-the-wrist control. Includes Pop-Up DOS™ and mouse menus to mousify almost any application. SRP: Serial-$119, Bus-$139, PS/2-$119, Serial & PS/2-$149.*

***TrackMan.™*** *Ingenious thumb-operated stationary mouse offers comfort and precision without desktop motion. Guaranteed compatible with all PC applications supporting Logitech or Microsoft® mice. SRP: Serial-$139, Bus-$149.*

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*Until the end of July, save up to $99 on these product bundles, at participating dealers.*

**Logitech Mouse (serial version) and Finesse DTP software**
*Suggested bundled price:* **$199**
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**Circle 2 on reader service card**

# We make a super VGA monitor

NEC presents the MultiSync® 2A, the best VGA monitor you can buy.

It's the first monitor from the leader in the color monitor industry that's been customized to the needs of the VGA user.

The MultiSync 2A is affordable and uncompromised. And compatible with all VGA modes. In short, it performs brilliantly. But what's equally important, it allows you to move effortlessly to the next major graphics standard: SuperVGA. That's something fixed-frequency monitors like IBM and Compaq can't do.

All this in a monitor that gives you a 14″ non-glare screen on a tilt-swivel base, for nearly 30% more viewing area than standard 12″ screens, as well as a new, ergonomically designed cabinet.

VGA mode shown at 320 x 200.

MultiSync is a registered trademark of NEC Technologies, Inc

MultiSync 2A. One super VGA monitor.

IBM is a registered trademark of International Business Machines Corporation.

C&C
Computers and Communications

# that's also a SuperVGA monitor.

But that's only part of the story. NEC also presents the best SuperVGA monitor you can buy. MultiSync® 2A.

The monitor that senses the software you're using and makes the switch from a VGA monitor to SuperVGA, the new standard developed by NEC and recognized by VESA. SuperVGA delivers a maximum resolution of 800 x 600, which is 56% higher than VGA.

After all, since you're most likely buying a board that goes beyond VGA, your monitor should too.

The MultiSync 2A is also available in a gray-scale version called the MultiSync GS2A monitor, with a 14″ paper-white flat surface screen.

Compaq is a registered trademark of Compaq Computers Corporation.

Either way, it's one super SuperVGA monitor. For literature call 1-800-826-2255. For information call NEC at 1-800-FONE-NEC.

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VESA is the Video Electronics Standards Association.

MultiSync 2A. One SuperVGA monitor.

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NEC

Circle 188 on reader service card

stated that upgrades are free to those who bought *Clipper* between June 1 and November 1, 1989. Actually, Nantucket guarantees a free upgrade to anyone who purchased the product between June 1 and the release of *Clipper 5.0*.

## Second Look: LAN Storage

*At* PC World *we make every effort to ensure that our reviews are accurate and our conclusions valid. Much to our embarrassment, "LAN Storage: It Doesn't Come Easy" (December 1989) contained factual errors that led to a number of faulty conclusions about several hard disks manufactured by Storage Dimensions.* PC World *regrets the errors, and we apologize for any problems our review may have caused our readers and Storage Dimensions.*

*After the original review appeared, we reexamined three of the Storage Dimensions products. Here are the conclusions we reached in our second look.*

### Storage Dimensions LANStor LAN335E

National Software Testing Laboratories (NSTL) NetWare tests showed that the NetWare-only LANStor LAN335E was the fastest of the ten-drive roundup, but here at *PC World* we were never able to get it to boot as a file server. Considering its apparent unreliability, short one-year warranty, and poor documentation, we rated it only a Fair value overall.

Statements by Storage Dimensions and Novell led us to blame the drive's problems on a bug in the drive's "nonstandard cold boot loader" software. After the review was published, Novell told us that the loader could not possibly have kept our drive from booting, and that the problem was most likely caused by a corrupted NetWare system file. In addition, we erroneously described the loader as a "patch," an alteration to a program. In fact, the loader simply starts NetWare and then removes itself from memory. NetWare's operation remains unchanged, and its operation should not be affected in any way.

Our inability to boot the drive kept us from awarding it the Excellent mark it deserves for its exceptional performance. It was 20 to 30 percent faster than the other manufacturers' drives in NSTL's multiuser data base tests, and it showed superior performance in the other NetWare tests as well. True, the LAN335E is not compatible with NetWare 2.0a, but since 2.0a users probably aren't interested in such large hard drives, we've upgraded the compatibility rating to Good for this drive.

These changed ratings make the LAN335E a Good value overall. If your dealer will install and stand behind it, it deserves serious consideration for heavily used file and multiuser data base servers.

**EXECUTIVE SUMMARY**

**Storage Dimensions LANStor LAN335E**
*Hard disk*

This NetWare-only drive is the fastest in the raundup. Despite its poor documentation, limited expansion, and short worranty, it's worth considering far heavily used servers.

| | POOR | FAIR | GOOD | EXCELLENT |
|---|---|---|---|---|
| Capacity/expandability | | ● | | |
| Setup and installatian | | ● | | |
| Campatibility | | | ● | |
| Warranty | | | ● | |
| Performance (NetWare) | | | | ● |
| Performance (DOS) n/a | | | | |
| Overall value | | | ● | |

Reader service na. 710

### Storage Dimensions LANStor LAN320S

We found the NetWare-only LANStor LAN320S relatively easy to install and highly expandable—you can add SCSI boards and drives for up to 4GB of disk storage. But on the basis of its short warranty and a mistaken belief that it was not Novell certified, we rated it only a Fair value overall.

Novell initially told our editors that it had not certified the NetWare compatibility of the LAN320S. During the final fact-checking process, however, a Novell spokesperson confirmed that the drive-controller combination we reviewed (the Maxtor 4380S drive and the Future Domain TMC830 SCSI adapter) was one of several Novell-certified configurations sold under the LAN320S label. That information made it into the Features Evaluation table but was contra-

**EXECUTIVE SUMMARY**

**Storage Dimensions LANStor LAN320S**
*Hard disk*

This NetWare-only drive is fast, relatively painless to install, and tops in NetWare expandability. If your mass storage needs are really massive, it merits a look—if you can live with its short warranty.

| | POOR | FAIR | GOOD | EXCELLENT |
|---|---|---|---|---|
| Capacity/expandability | | | | ● |
| Setup and installatian | | | ● | |
| Campatibility | | | ● | |
| Warranty | | | ● | |
| Performance (NetWare) | | | | ● |
| Performance (DOS) n/a | | | | |
| Overall value | | | ● | |

Reader service na. 711

*(continues)*

# One step closer to a mainframe of your own.

Hard to believe? Take a look at the benchmarks.

The STEP 486*is*™ breezes past both an IBM 3083 mainframe and a CRAY-X-MP/48 supercomputer as if they were standing still.

The primary reason is Everex's proprietary Advanced Memory Management Architecture. We were the pioneers in bringing this write-back technology from the mainframe to the desktop.

AMMA™ enhances the i486™ embedded cache—a combination we call "Two-Tier Caching." It makes the STEP 486*is* one of the fastest 486 PCs available today.

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The upshot of it all? The STEP 486*is* will not only take you into the next generation of software, it'll run today's 286 and 386 software with scorching speed.

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**Circle 72 on reader service card**

# Now the #1 spreadsheet gives

## Lotus® 1-2-3® Release 2.2: The All-Purpose 1-2-3

What if we took the world's leading spreadsheet — the business standard for seven years — and made it more powerful...easier to use and customize...yet very compact and extremely fast? That's what 1-2-3 Release 2.2 is all about.

Release 2.2 lets you build more flexible worksheets and applications. With file linking, you can create links between worksheets in memory and on disk, so you can make better use of your PC's memory.

We've also built *Allways*™, The Spreadsheet Publisher, right in, to give you true presentation-quality output. Allways offers a WYSIWYG display, up to 8 different fonts, shading, boxes and gridlines. Plus Release 2.2 lets you combine text and graphs on the same page.

And Release 2.2 lets you get more done in less time with "minimal recalc," so only the formulas or cells affected by a change in the worksheet are recalculated.

You'll also find an undo command for easier error recovery; a global search and replace function that makes changes automatic; a new built-in add-in manager allowing direct access to hundreds of add-in products used to customize 1-2-3. Plus new macro commands and macro enhancements.

For convenience, Learn mode records keystrokes while you work to simplify writing macros; and there are 8 new setting sheets that let you view your spreadsheet settings on a single screen.

If you are a DOS PC user, Lotus 1-2-3 Release 2.2 will give you everything you expect from 1-2-3...and more.

**System Requirements:** All types of IBM PCs & Lotus-certified compatibles running DOS 2.2 or higher. Minimum 320K RAM (512K required with Allways).

## Lotus 1-2-3 Release 3: The Advanced 1-2-3

Release 3 gives you a whole new way to take advantage of the power built into your PC. Lotus' new 3-dimensional technology lets you more easily manage spreadsheet data and complex applications, while giving you unparalleled flexibility to analyze and organize information.

The new multi-sheet, multi-file design, known as true 3D, lets you move quickly and easily between worksheets, viewing several sheets or files at the same time.

With true 3D and advanced file linking, Release 3 now lets you link complex formulas across worksheet files — and link multiple cells — then update them all with a single command. Consolidating large amounts of data is now easier than ever.

New relational database features enhance your ability to query, analyze and report database information...plus do joins and aggregations. A new "data external" capability lets you access and use non-1-2-3 data from within 1-2-3 without translating or re-keying. We've even included a sample dBASE III® driver.

There are now over 200 graph combinations with a variety of colors, hatching patterns, fonts and text sizes. You can print graphs and text on the same page; print while working on a spreadsheet; print right from the menu with no setup strings; and use a full range of graphics and laser printers, including PostScript® printers. And Release 3 is fully customizable with the Lotus Add-in Toolkit.

For the new dimension in spreadsheet power and performance, Lotus 1-2-3 Release 3 is your best choice.

**System Requirements:** 286/386 PCs running DOS 3.0 or higher or OS/2 1.0 or higher. 1Mb RAM required with DOS, 3Mb RAM with OS/2. Hard disk required.

## Lotus 1-2-3/G: The Graphical 1-2-3

Lotus 1-2-3/G™ is the only spreadsheet that gives you the power and ease-of-use of 1-2-3 in the graphical user interface (GUI) environment of OS/2® Presentation Manager.™

1-2-3/G will seem instantly familiar, because it preserves the 1-2-3 commands and keystrokes you already know. It also gives you everything you expect from GUI, including pull-down menus, multiple windows, full mouse support and a "What-You-See-Is-What-You-Get" display.

What's more, 1-2-3/G *improves on* GUI, with features like color palettes and font previews in dialog boxes, and direct manipulation of objects on the screen. Plus any function can be performed using either the keyboard, the mouse, or both.

1-2-3/G delivers the powerful features found in Release 3, like 3D worksheets, file linking to files in memory or on disk, external data access and relational database capabilities, plus new and improved business graphics. And you can print it all out with presentation-quality results.

Our new goal-seeking technology, *Solver*, takes you beyond "what if"...to show you "how to" achieve desired results, based on the variables in your worksheet. Solver quickly presents your alternatives — even the optimal answer. For example, the production mix that will maximize profit.

Plus, 1-2-3/G takes full advantage of the large memory and multi-tasking capabilities of OS/2. And it supports Dynamic Data Exchange, so you can exchange live data with other OS/2 applications.

Simply put, 1-2-3/G gives you the best of 1-2-3 *and* the best of GUI.

**System Requirements:** IBM PC AT, PS/2 models 50Z, 60, 70, P70, 80, Compaq 286, 386 or 100% compatibles. OS/2 1.1 or higher. Minimum 4Mb RAM.

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# Lotus 1-2-3 Upgrade Order Form

To upgrade to Lotus 1-2-3 Release 2.2...1-2-3 Release 3...or 1-2-3/G, simply complete this Order Form and see reverse side for mailing instructions.

| Product | Qty. | Media/Disk Type | Part No. | Price | Total |
|---|---|---|---|---|---|
| 1-2-3 Release 2.2 | _____ | 5.25″ | 9100 | $150 | _____ |
| Upgrade: | _____ | 3.5″ | 9105 | $150 | _____ |
| 1-2-3 Release 3 | _____ | 5.25″ | 9130 | $150 | _____ |
| Upgrade: | _____ | 3.5″ | 9135 | $150 | _____ |
| 1-2-3/G | _____ | 5.25″ | 9190 (9193) | $150 ($75†) | _____ |
| Upgrade: | _____ | 3.5″ | 9195 (9198) | $150 ($75†) | _____ |

**Please allow 2-3 weeks for delivery.**

Subtotal _____

Tax* _____

TOTAL _____

Name _____
First Last Initial

Company _____

Street Address _____

City _____ State _____ Zip _____

Daytime Phone (_____) _____
Area Code

XAKBI

Method of Payment:

☐ Check (Payable to Lotus Development Corp.)

☐ Purchase Order (Original P.O. *must* accompany this form. Minimum purchase order amount is $500.)

☐ American Express ☐ Visa ☐ MasterCard

Credit Card

Exp. Date

Signature _____ Date _____
Required for all credit card orders

IMPORTANT: Enclose (1) One original 1-2-3- System Disk or Backup System Disk per upgrade ordered;
(2) Completed Order Form;
(3) Payment.

Mail to: Lotus Development Corporation
Upgrade Center G, P.O. Box 9130, Cambridge, MA 02139-9130

Lotus accepts payment by check, money order, MasterCard®, Visa® or American Express®. If paying by credit card, be sure to write in the credit card number and expiration date and add your signature.

*Include applicable sales tax in the following states: California, Connecticut, Florida, Georgia, Illinois, Maryland, Massachusetts, Michigan, Minnesota, New Jersey, New York, Ohio, Pennsylvania, Virginia, Texas, Washington (State).

Offer valid in U.S. only. Canadian customers please call 1-800-668-1509

†If you have already purchased 1-2-3 Release 2.2 or 1-2-3 Release 3, you can upgrade to 1-2-3/G at a special *reduced rate* of just $75. Offer valid through 9/30/90. Select media version on Order Form and enclose $75 payment with your original Release 2.2 or Release 3 System Disk as proof of purchase.

# you 3 ways to work smarter.

*Use this chart to select the Lotus 1-2-3 upgrade that's right for you.*

| | 1-2-3 Release 2.2 | 1-2-3 Release 3 | 1-2-3/G |
|---|---|---|---|
| *Spreadsheet* | • 2D spreadsheets<br>• File linking<br>• Minimal recalc | • True 3D worksheets<br>• Advanced file linking<br>• Optimal recalc | • Graphical User Interface<br>• True 3D worksheets<br>• Advanced file linking<br>• *Solver* goal-seeking technology |
| *Database* | • Flatfile database<br>• New setting sheets | • Relational database<br>• External data access | • Relational database<br>• External data access |
| *Graphics* | • Easy to create a variety of high-impact graphs<br>• Graph Group | • Over 200 graph options<br>• HotView graph window<br>• Instant Quick Graph | • Improved graphics<br>• Graph gallery<br>• Multiple graph windows |
| *Output* | • Presentation-quality results on over 90 printers<br>• Print text/graphs on same page<br>• Built-in spreadsheet publishing | • Presentation-quality output<br>• Print text/graphs on same page<br>• Print directly from the menu | • Presentation-quality output<br>• Print text/graphs on same page<br>• Print preview |

## Upgrade Now!

No matter what your spreadsheet requirements are, no matter what hardware you have, there's a version of Lotus 1-2-3 that's exactly right for the way you work today.

The experts have confirmed what 1-2-3 users have known all along. *Software Digest* ranked 1-2-3 the #1 spreadsheet for the sixth straight year.

And in its debut showing at last November's Comdex show, 1-2-3/G won *BYTEWEEK's* "Best Software Product" award, hands down.

To upgrade to any one of these new Lotus 1-2-3 versions, simply complete the Order Form, enclose payment, your original 1-2-3 System Disk, and mail to the address shown on the Order Form. If the Order Form has been used, **call 1-800-TRADEUP, Ext. 157, to receive your 1-2-3 Upgrade Ordering Kit.**

# Lotus 1-2-3

## The Spreadsheet of Choice

## Lotus 1-2-3 Upgrade Order Form

To upgrade to Lotus 1-2-3 Release 2.2...1-2-3 Release 3...or 1-2-3/G, simply complete this Order Form and mail to:
**Lotus Development Corporation, Upgrade Center G, P.O. Box 9130, Cambridge MA 02139-9130.**

Name _____
First Last Initial

Title _____

Company _____

Street Address _____

City _____ State _____ Zip _____

Daytime Phone ( ) _____
Area Code

XAK

| Product | Qty. | Media/Disk Type | Part No. | Price | Total |
|---|---|---|---|---|---|
| 1-2-3 Release 2.2 | _____ | 5.25″ | 9100 | $150 | _____ |
| Upgrade: | _____ | 3.5″ | 9105 | $150 | _____ |
| 1-2-3 Release 3 | _____ | 5.25″ | 9130 | $150 | _____ |
| Upgrade: | _____ | 3.5″ | 9135 | $150 | _____ |
| 1-2-3/G | _____ | 5.25″ | 9190 (9193) | $150 ($75†) | _____ |
| Upgrade: | _____ | 3.5″ | 9195 (9198) | $150 ($75†) | _____ |

Please allow 2-3 weeks for delivery.

Subtotal _____

Tax* _____

TOTAL _____

Method of Payment:

- ☐ Check (Payable to Lotus Development Corp.)
- ☐ Purchase Order (Original P.O. *must* accompany this form. Minimum purchase order amount is $500.)
- ☐ American Express
- ☐ Visa
- ☐ MasterCard

Credit Card _____ Exp. Date _____

Signature _____ Date _____
Required for all credit card orders

**IMPORTANT: Enclose (1) One original 1-2-3 System Disk or Backup System Disk per upgrade ordered; (2) Completed Order Form; (3) Payment.**

Lotus accepts payment by check, money order, MasterCard®, Visa® or American Express®. If paying by credit card, be sure to write in the credit card number and expiration date and add your signature.

*Include applicable sales tax in the following states: California, Connecticut, Florida, Georgia, Illinois, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New York, Ohio, Pennsylvania, Virginia, Texas, Washington (State).

Offer valid in U.S. only. Canadian customers please call 1-800-668-1509

†If you have already purchased 1-2-3 Release 2.2 or 1-2-3 Release 3, you can upgrade to 1-2-3/G at a special *reduced rate* of just $75. Offer valid through 9/30/90. Select media version on Order Form and enclose $75 payment with your original Release 2.2 or Release 3 System Disk as proof of purchase.

dicted by the unchanged text and Executive Summary. We've upgraded the compatibility rating to Good for this drive as well.

In the NSTL tests, the LAN320S came in second only to the LAN335E, and it was 13 to 18 percent faster than the other manufacturers' drives in the multiuser data base tests. We've upgraded its performance rating to Excellent.

If you need a huge amount of storage on a single server, a herd of LAN320S's is a good value, provided you can count on your dealer for installation and support.

**Storage Dimensions SpeedStor AT320S**

We found the SpeedStor AT320S highly expandable (up to 2.2GB per server with daisy-chained drives). However, it was slow and had a short one-year warranty. Those factors, plus an editing slip-up that led us to give it a Poor rating on installation, resulted in an overall rating of Fair.

For the same article, we also reviewed a different drive, the SpeedStor AT335E, which requires a tortuous installation process. A description of that process was inadvertently included in the AT320S review, which led to the drive's receiving a Poor rating on setup and installation. In fact, the AT320S's automated installation utility worked smoothly, and the drive did not require a low-level format. The drive should have been rated Good on setup and installation.

You can't format the AT320S as one bootable partition with DOS 3.31 or 4.0; instead, you have to create a small, bootable C: drive and a single large D: drive. On that basis we rated the AT320S's compatibility merely Fair, but since this configuration is really just a minor inconvenience, the compatibility rating is also raised to Good.

Despite the upgraded ratings in these two categories, with its average speed and short warranty, the AT320S remains a Fair value.

**Buying Considerations**

To merit a Best Buy, a hard disk must combine low price, top performance, easy installation, and good product support, and it needs to back up its claims of reliability with a long warranty. In our earlier review, no product put together the whole winning package. Since the very expensive Plus Impulse was the only drive nonexperts could be confident of installing successfully, we recommended that smart buyers leave installation to their dealers. (A Good rating on setup and installation indicates that professionals should be able to install the drive in a few hours.)

Despite their upgraded ratings, these Storage Dimensions drives still don't meet our Best Buy criteria. The LAN335E deserves serious consideration for running busy multiuser data bases, and for those with unusually large storage needs, daisy-chained LAN320S drives offer up to 4GB of storage in a single NetWare server. But for most LANs, the Priam Innerspace 330-E remains the best choice of the drives in the original review, thanks to its superior three-year warranty.

*To send correspondence, please see How to Contact PC World, page 4.* ●

**EXECUTIVE SUMMARY**

**Storage Dimensions SpeedStor AT320S**

*Hard disk*

The DOS version of the LAN320S can be daisy-choined for up to 2.2GB of storage. But its lock-luster performance ond short warranty keep it out of the running.

| | POOR | FAIR | GOOD | EXCELLENT |
|---|---|---|---|---|
| Copacity/expandability | | | ● | |
| Setup and installatian | | | ● | |
| Compatibility | | | ● | |
| Worronty | | | ● | |
| Performance (NetWore) n/o | | | | |
| Perfarmance (DOS) | | ● | | |
| Overall value | | ● | | |

Reader service na. 712

**POWER TIP NO. 100**

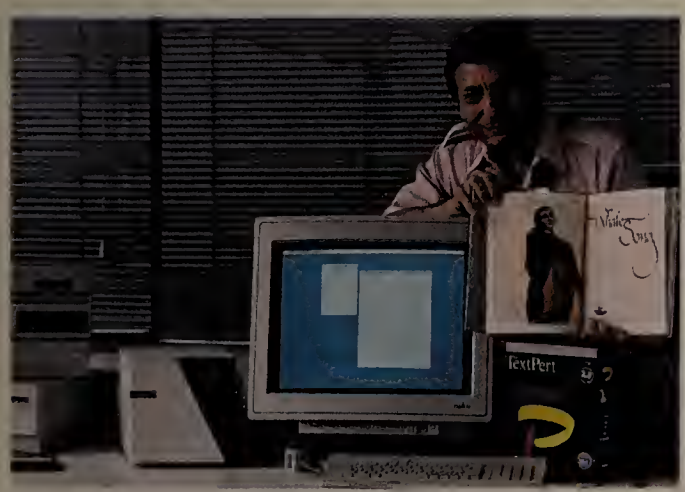
**Turbo Pascal: And Or What?**

If you are getting error messages when compiling a *Turbo Pascal* program and the compiler stops at a line that looks perfectly good to you, make sure the operators in that line are being processed in the correct order. Boolean operators such as OR or AND are often problematic, especially when one (or more) of the Boolean terms is a mathematical expression. Liberal use of parentheses, even when redundant, will help ensure that the compiler reads a line the way you intended it to be read. For example, instead of 'if Num1 = 8 or Num1 = 4 then', use 'if (Num1 = 8) or (Num1 = 4) then'.

*Max Weinryb*
*Berkeley, California*

# TextPert reduces your data entry costs

Award winning photographer and publisher, Robert Goodman has created several books using traditional methods. Although his books were award winners... "The bad news", says Goodman, "arrived daily with high bills for typesetting, design, paste–ups..., the list seemed endless".

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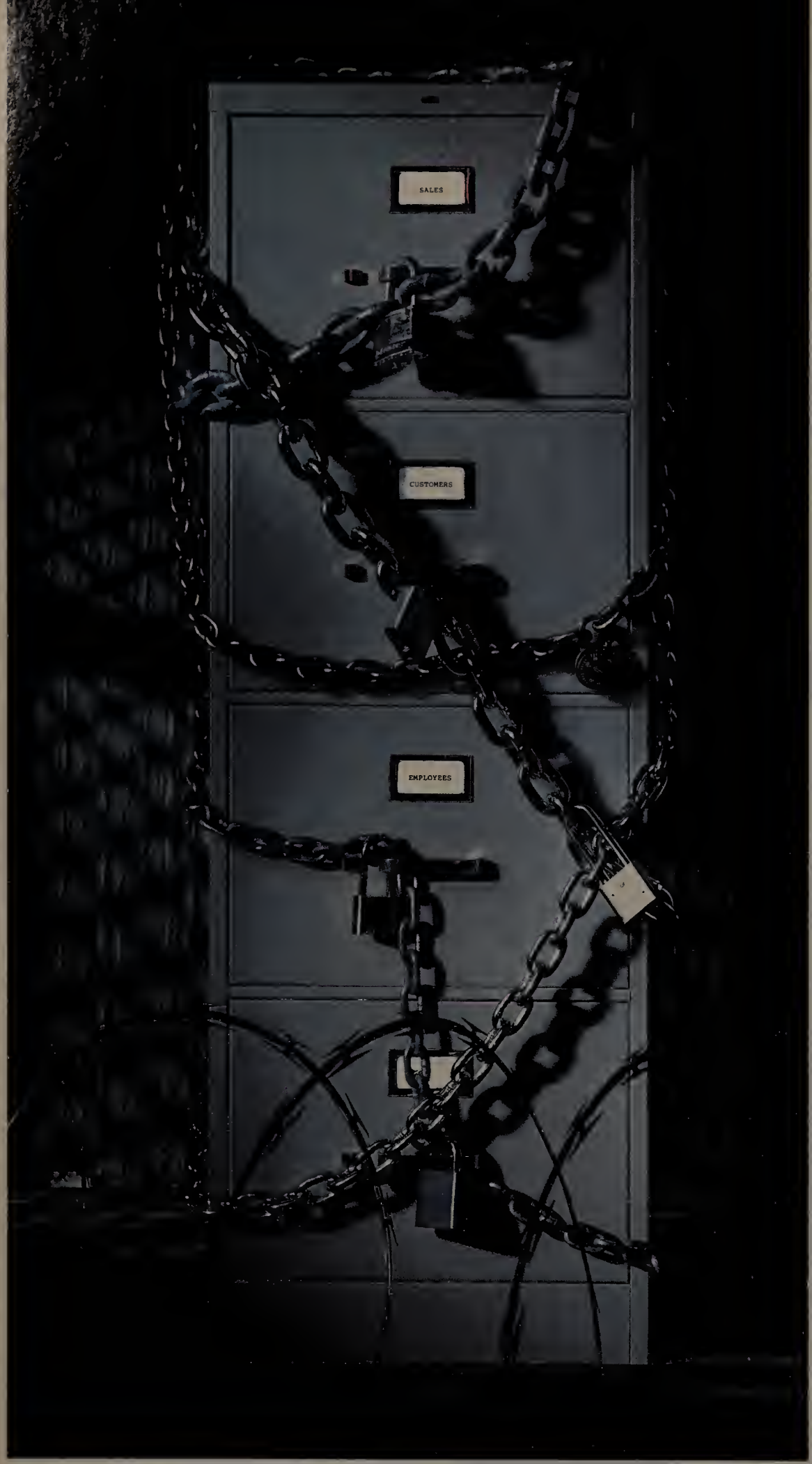


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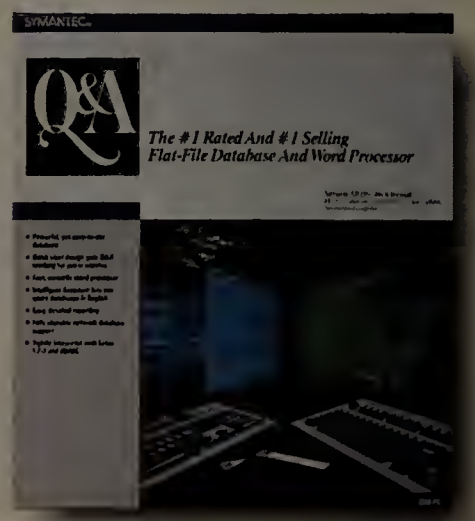


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**Circle 249 on reader service card**

# THE HELP SCREEN

**PC World offers answers and advice at every level**

Find the proper DOS upgrade, unscramble hard disk acronyms, discover a deficiency in FORMAT, automate DSZ's ZMODEM protocol for Procomm Plus, and learn another way to print ASCII on a PostScript printer.

***Karl Koessel***

## The Straight and Narrow Upgrade Path

**Q.** *I have a floppy-based PC that runs DOS 2.0. How can I copy DOS 3.2 from my neighbor's hard disk so that I can upgrade my DOS version?*

*Celia A. Hayes*
*Scotia, New York*

**A.** There's really only one way to upgrade your DOS using your neighbor's version: illegally. DOS, like all software, is the product of much labor, and it is licensed for use on only *one* system at a time. To copy it for use on another system is a violation of copyright law. It's theft.

Of course, there are legal ways to upgrade your DOS. If you're using MS-DOS, you can purchase a new version from the vendor that sold you your PC. Since Microsoft's current licensing policy allows a vendor to sell DOS only with a system or as an upgrade to a version that the vendor sold with a system, your vendor is the only one who can supply you with a new version of MS-DOS.

You can also upgrade to a recent version of PC-DOS. IBM allows vendors of its products to sell its PC-DOS to all comers. You can use PC-DOS even if your PC isn't an IBM system. However, the BASIC and BASICA interpreters included with PC-DOS require a ROM-based BASIC kernel, found only in IBM systems. They won't work in a non-IBM PC.

## Drives Me Crazy

**Q.** *I'm in the market for a PC, and I'm confused by some of the terms I see in ads. What's the difference between an ordinary hard disk and an RLL (Run-Length Limited) hard disk? What's the difference between a hard disk and a Hardcard? What are ESDI, SCSI, and IDE devices, and which is best?*

*PFC Joey Colchins*
*APO, New York*

**A.** Let's begin with some hard disk basics. A hard disk subsystem consists of one or more metal platters—each coated with a magnetic medium—spinning in unison at 3600 rpm in a metal box, as well as three crucial electronic circuits and a way to attach everything to the computer. The controller circuitry controls the disk, the data separator circuitry produces the proper electronic signals from the magnetically stored data, and the bus adapter circuitry communicates those signals to the computer. Generally, the drive itself, like a floppy drive, is held in a device bay, while the electronics are on a board in an expansion slot.

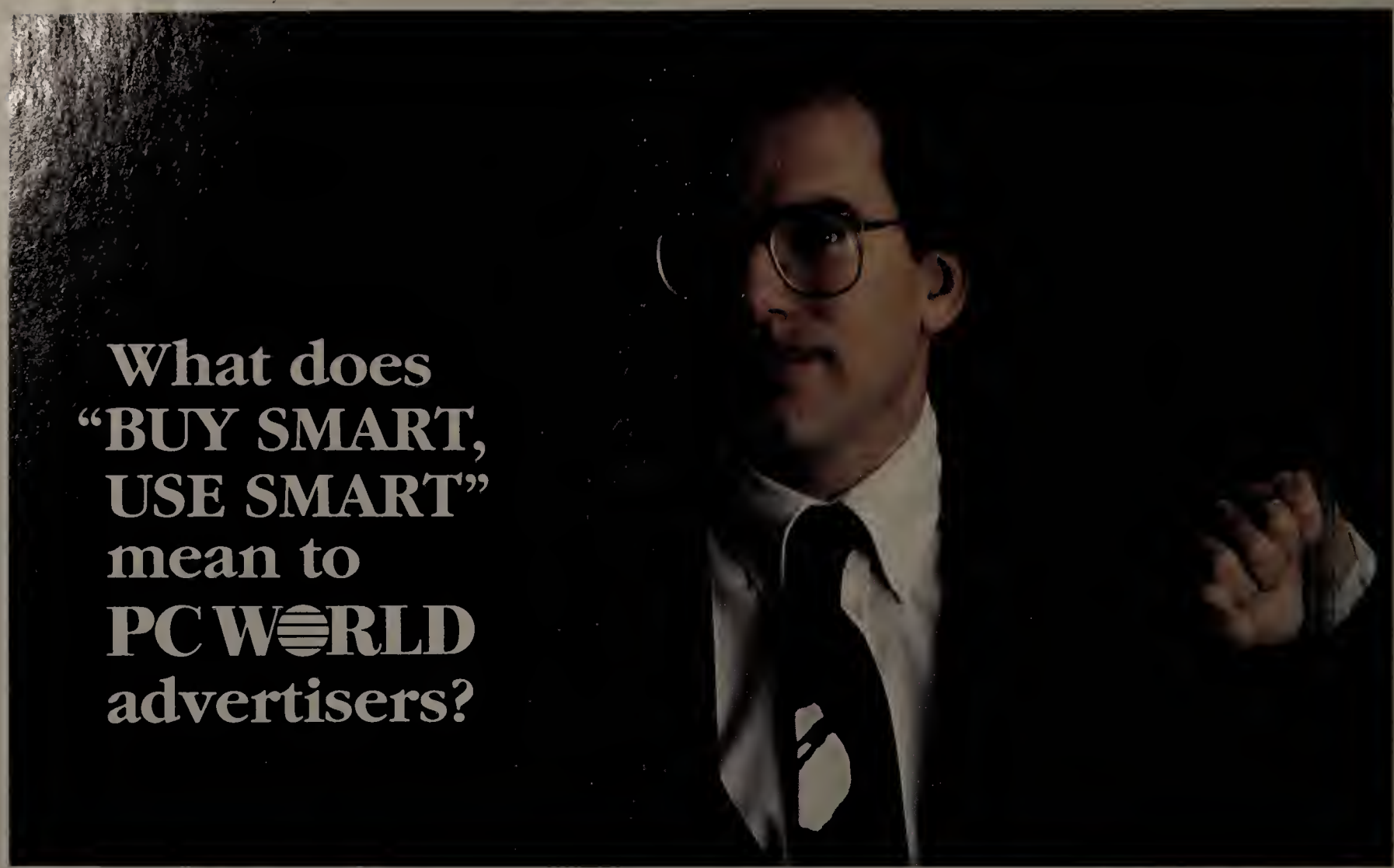
Hard drives and their electronics have become so small that manufacturers can integrate the actual hard disk and the controller electronics all on a PC expansion board that fits in the space of one to one-and-a-half PC slots. (No hard disk cards have been made yet for Micro Channel–based systems, which use smaller expansion boards.) Some manufacturers simply slap a standard hard disk onto an expansion card. Plus Development Corporation, however, designed its award-winning Hardcard from scratch (and trademarked the name as well). Ease of installation has made hard disk cards popular.

Digital data is recorded on a platter's surface in individual,

*(continues)*

ANTHONY RUSSO

Richard Landry, editor-in-chief, *PC World*

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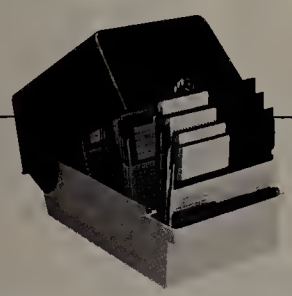

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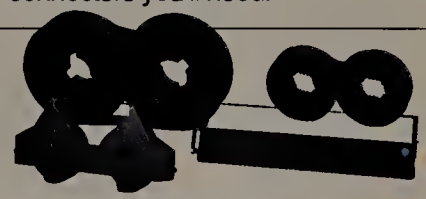

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concentric *tracks*. Therefore, disk storage is the product of the number of platters, tracks per platter, and recording density (or bits) per track. An "ordinary" hard disk's controller stores data using a technique called MFM (Modified Frequency Modulation), which stores bits of information by changing the polarity of the magnetic field along a track.

RLL (Run-Length Limited, also known as 2,7 RLL) is a data-encoding technique that enables a drive to store about 50 percent more data than MFM. ARLL (Advanced Run-Length Limited, also known as 3,9 RLL) packs even more information, doubling MFM capacity. Although you can replace an MFM drive's controller with an RLL or ARLL controller, the higher-density formats can cause problems for some older-technology MFM drives. Virtually all popular drives made today use RLL or ARLL encoding techniques and don't advertise the fact. However, reliability, durability, and speed are more important than encoding techniques.

The ST506/412 industry standard used by the original IBM XT and AT placed all the electronics on an expansion board. By moving the data separator circuitry onto the drive itself, ESDI (Enhanced Small Device Interface) provides much faster throughput than the old standard. Also, an ESDI drive is easier to initialize because, unlike its predecessor, it holds configuration (number of heads, cylinders, and so on) and bad sector information on the drive itself in a standardized form that the controller can read. Currently you can install up to four ESDI controllers in a PC, each of which supports two drives.

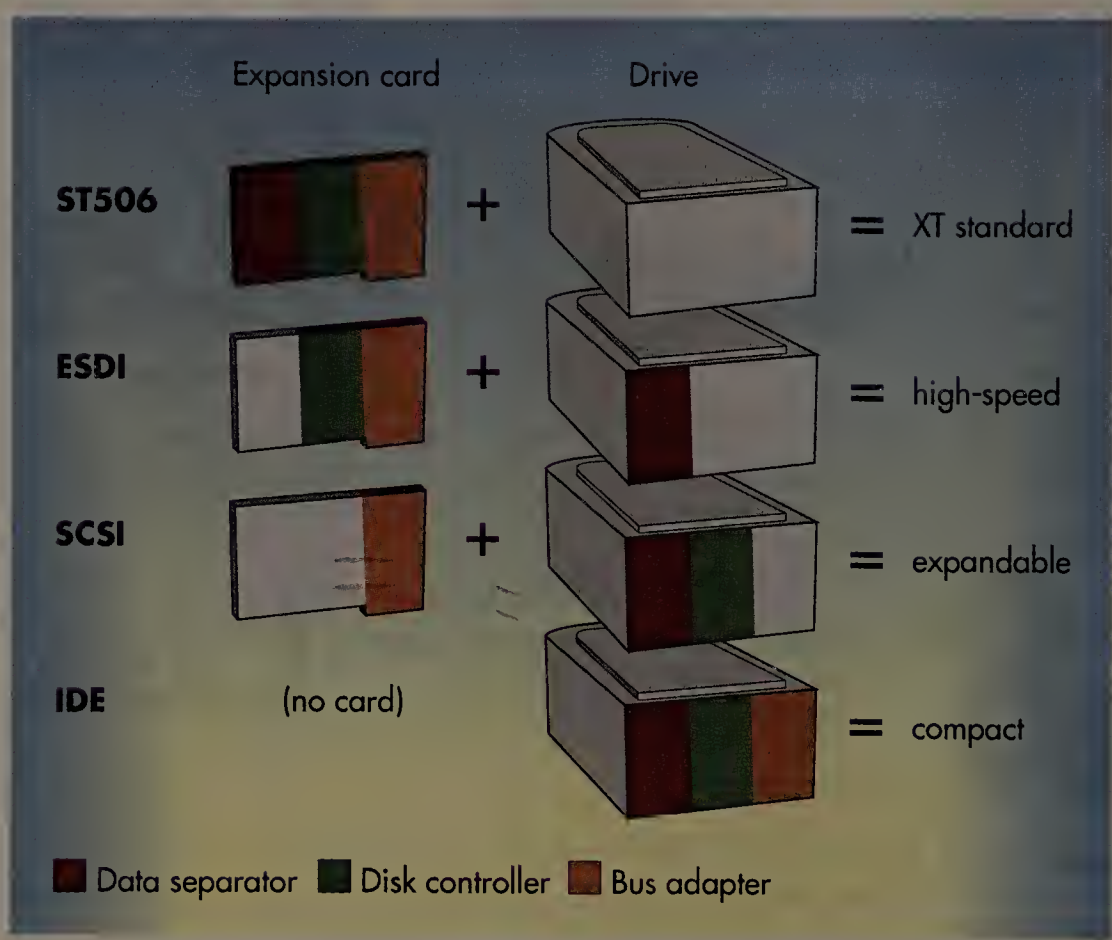
SCSI (Small Computer System Interface) drives are designed to connect to a SCSI adapter. The SCSI standard enables manufacturers to design devices that include their own controllers and that can plug into any SCSI adapter, whether it's in a PC, a Macintosh, or whatever. A SCSI drive, therefore, has both the controller and data separator circuitry on the drive. Theoretically, up to seven SCSI devices (each with eight logical units) can be daisy chained to one SCSI port adapter. Practically, however, not all SCSI devices are compatible, so mixing hard drives with other devices isn't always possible.

In a single-user environment, there's currently not much difference in performance, expandability, or reliability between ESDI and SCSI drives. On a network server with multiple drives, however, SCSI may provide greater throughput than ESDI because the individual embedded controllers enable the system to retrieve data from several drives simultaneously.

Shaped to fit into a device bay, an IDE (Integrated Drive Electronics) drive, like the Hardcard, has all its electronics embedded in the drive. This type of drive could be cabled directly into a computer's expansion bus, but that would waste a slot just as using a separate controller does. Instead, IDE drives are used only in PS/2s and other systems that provide an IDE connector on the motherboard.

*(continues)*

## Hard Disk Evolution




**Because data separator circuitry is on the drive itself, ESDI hard disk systems deliver faster throughput than the standard ST506 models. SCSI drives also include disk controller circuitry, enabling a single adapter board to support multiple drives operating concurrently. IDE integrates all the electronics onto the drive, allowing you to cable the drive directly to a suitable motherboard.**

Other laser printers play with one standard dot size.

# HP makes it a

ASTRONOMY IS LOOKINGUP

THE HIRSCH REPORT OF THE SKIES — VOL. 8, NO. 4, FALL 1990

**STAR SHORTS**

***Reported by The Ster***

Every day billions of dust particles enter into Earth's atmosphere. Now scientists are working to make meteor-burst communication a practical and economical alternative to the use of tele-

*(continued on page 2)*

***You Can't See the Great Wall from the Moon!***

Everyone has heard that you can see the Great Wall of China from the Moon. Or from Earth orbit. Or even from Mars. Certainly you cannot see the Great Wall from the Moon. According to an astronaut, it's difficult even seeing continents. You may be able to see the Great Wall from orbit, but, in general, it's difficult even to see familiar objects; the planet's swift mo-

*(continued on page 3)*

*Voyager's Last Picture Show:*
*When Voyager 2 was launched 12 years ago, who could have imagined these photos at this point in time.*

*More on planetary explosions inside.*

**NO BLACK HOLES?**

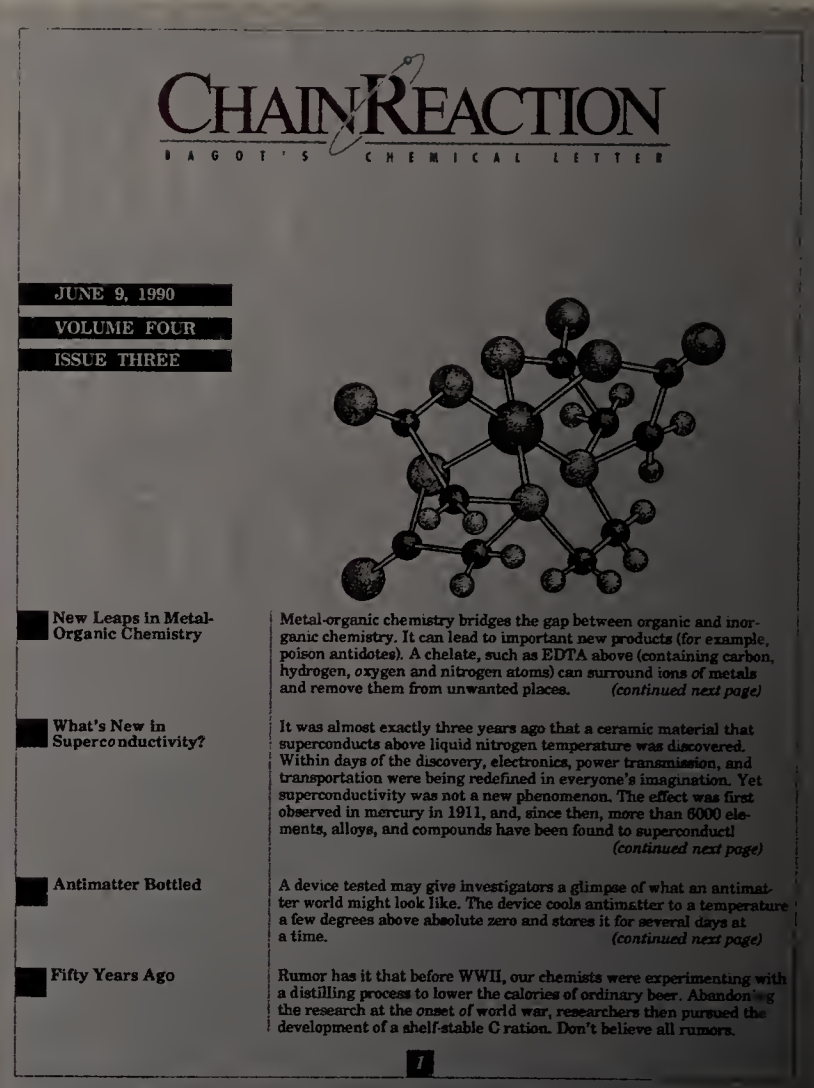
Scientists are still unable to confirm the existence of even a single black hole, despite widespread belief that such things should exist. Tracking down these invisible objects isn't easy, because they can only be studied indirectly by the effects they have on their surroundings. There are several types of places that

*(continued on page 3)*

**MIRROR, MIRROR**

It's a chore, but all reflecting telescopes require cleaning their reflective mirrors. Eventually, the aluminum coating on their mirrors deteriorates and needs replacing. For large instruments, the process requires removing the tele-

*(continued on page 5)*



CHAIN REACTION

BAGOT'S CHEMICAL LETTER

JUNE 9, 1990
VOLUME FOUR
ISSUE THREE

**New Leaps in Metal-Organic Chemistry**

Metal-organic chemistry bridges the gap between organic and inorganic chemistry. It can lead to important new products (for example, poison antidotes). A chelate, such as EDTA above (containing carbon, hydrogen, oxygen and nitrogen atoms) can surround ions of metals and remove them from unwanted places. *(continued next page)*

**What's New in Superconductivity?**

It was almost exactly three years ago that a ceramic material that superconducts above liquid nitrogen temperature was discovered. Within days of the discovery, electronics, power transmission, and transportation were being redefined in everyone's imagination. Yet superconductivity was not a new phenomenon. The effect was first observed in mercury in 1911, and, since then, more than 6000 elements, alloys, and compounds have been found to superconduct! *(continued next page)*

**Antimatter Bottled**

A device tested may give investigators a glimpse of what an antimatter world might look like. The device cools antimatter to a temperature a few degrees above absolute zero and stores it for several days at a time. *(continued next page)*

**Fifty Years Ago**

Rumor has it that before WWII, our chemists were experimenting with a distilling process to lower the calories of ordinary beer. Abandoning the research at the onset of world war, researchers then pursued the development of a shelf-stable C ration. Don't believe all rumors.

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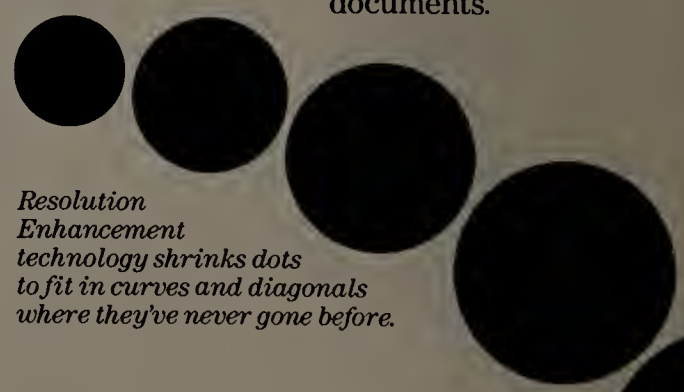

*Resolution Enhancement technology shrinks dots to fit in curves and diagonals where they've never gone before.*

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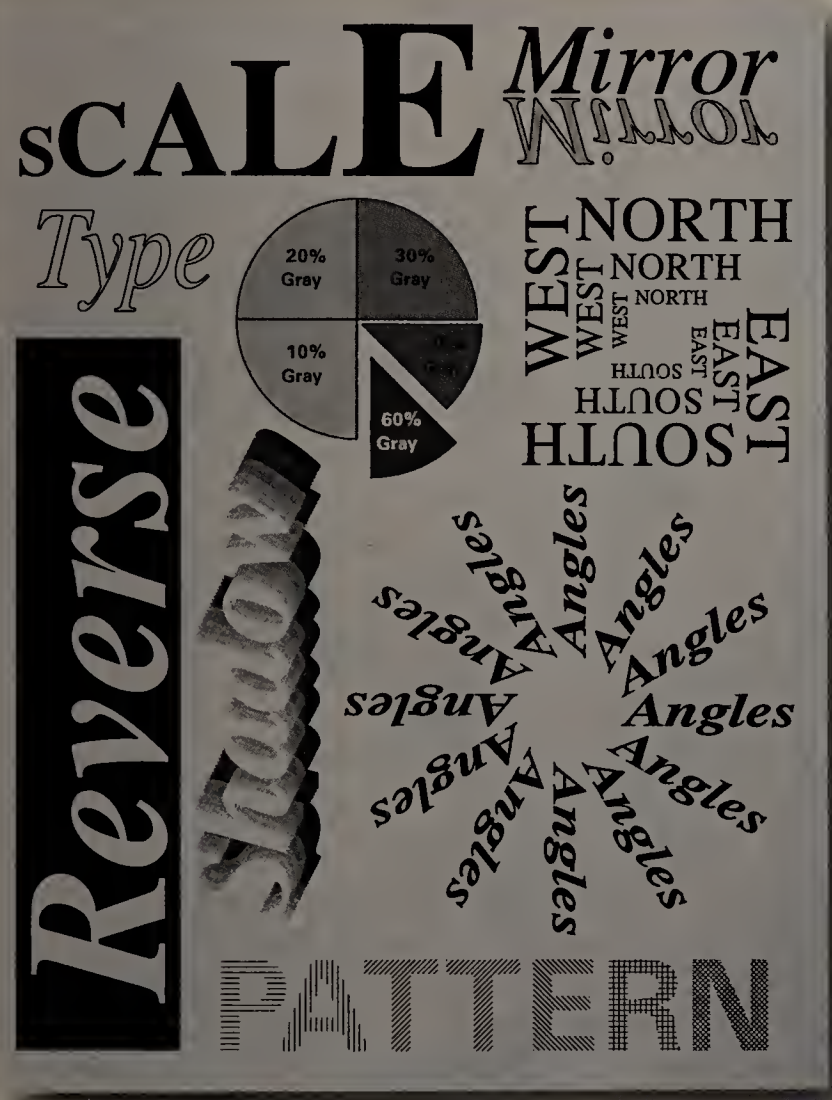
# whole new ball game.



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### Format Failure From F>

**Q.** *I'm puzzled. I've been using a 120MB hard disk—which I've divided into four 30MB volumes (C:, D:, E:, and F:)—for several months now without incident. But the other day I tried to create a bootable disk in drive A: by using the command FORMAT A: /S at the DOS F> prompt; I received the message 'Insert DOS disk in drive A: and strike ENTER when ready'. I pressed <Ctrl>-<Break> instead, changed to drive C:, and reissued the FORMAT command successfully.*

*My system boots DOS 3.3 from hard disk drive C:, and its PATH includes the C:\DOS subdirectory, which holds FORMAT and the DOS disk's other files. Why won't my system format a disk when C: isn't the default drive?*

*Mark Mueller*
*St. Louis, Missouri*

**A.** Your PATH enables DOS to find and run FORMAT, but FORMAT looks only at the root directory of the default drive for the hidden system files that it needs to copy in order to make the newly formatted disk bootable. Since drive F: doesn't have those files, DOS prompts you to insert a disk with those files (that is, a bootable DOS disk) in drive A:.

Maybe someday Microsoft will improve FORMAT so that the command will, if necessary, read the system environment variable COMSPEC to learn which drive holds COMMAND.COM and then check that drive for the hidden system files.

### More ZMODEM for Procomm Plus

**Q.** *Procomm Plus and* DSZ *[which adds ZMODEM support to* Procomm Plus*] work great if you're calling one of the big boards [like CompuServe; see "ZMODEM for Procomm Plus" in last February's* Help Screen*]. When using rural phone lines, ZMODEM's error recovery is occasionally a real blessing. However, because Procomm's host mode doesn't offer ZMODEM as a protocol option, I'm unable to use ZMODEM when calling friends locally. Do you have any suggestions?*

*D. L. Gelder*
*Portville, New York*

**A.** Not for the current version. Datastorm promises the next version will include ZMODEM protocol for both host and terminal modes but can't say when it will appear.

While we're on the subject, I'd like to pass along reader Alexander Goldfinger's method of integrating *Procomm Plus* and *DSZ:*

First, create the batch files ZMODEM-U.BAT and ZMODEM-D.BAT (see **LISTING 1**), replacing 'c:\pcplus\dnloads'

*(continues)*

**ZMODEM=U.BAT**
```
c:\dsz\dsz ha both sz %1 %2 %3 %4 %5 %6 %7 %8 %9
echo ^G
```

**ZMODEM=D.BAT**
```
c:\dsz\dsz ha both rz c:\pcplus\dnloads
echo ^G
```

**LISTING 1: Installing these batch files as Procomm Plus external protocol options makes using DSZ's ZMODEM protocol simple.**

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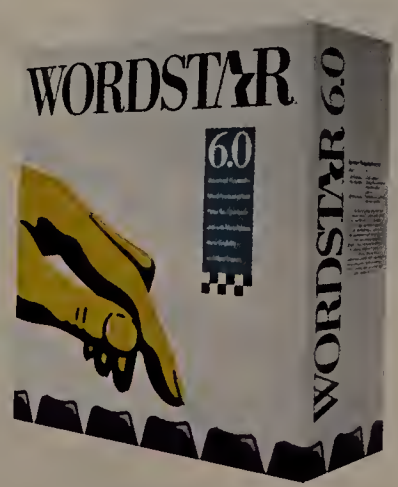


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Circle 277 on reader service card

# Another hot one from the developers of PROCOMM PLUS.

*Introducing* HOT WIRE, *the single solution for the 3½" to 5¼" disk-format double standard.*

Lighting a fire in productivity requires the perfect match. For communications, it's PROCOMM PLUS. For file transfers and disk management, it's HOT WIRE.

With point-and-shoot simplicity, HOT WIRE quickly transfers files between any configuration of IBM-compatible 3½" and 5¼" format PC's. And, it provides powerful disk management features for maintaining files.

So, if you want to set productivity aflame, ask your software dealer about the new one from DATASTORM that sizzles with power, speed and simplicity. HOT WIRE.

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P.O. Box 1471 ■ Columbia, MO 65205
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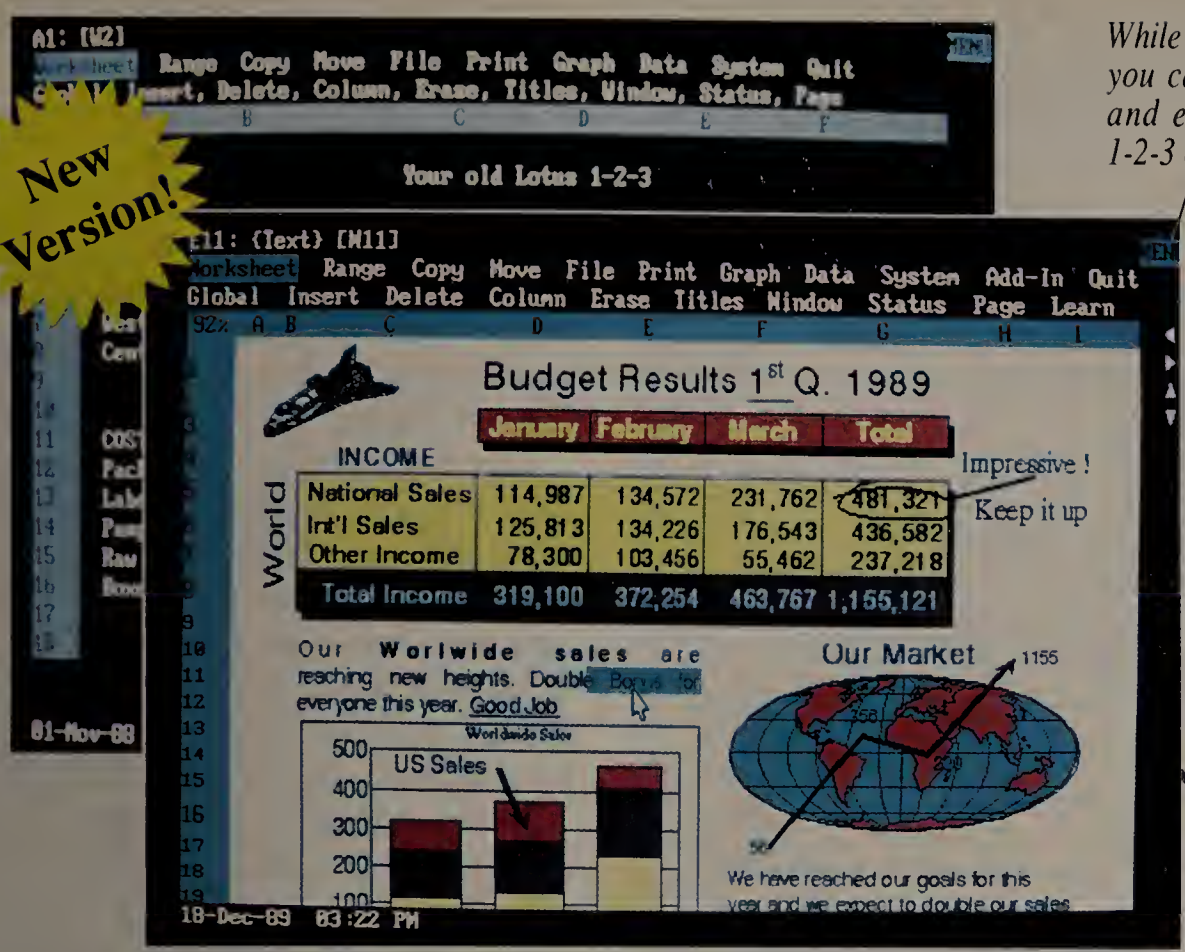
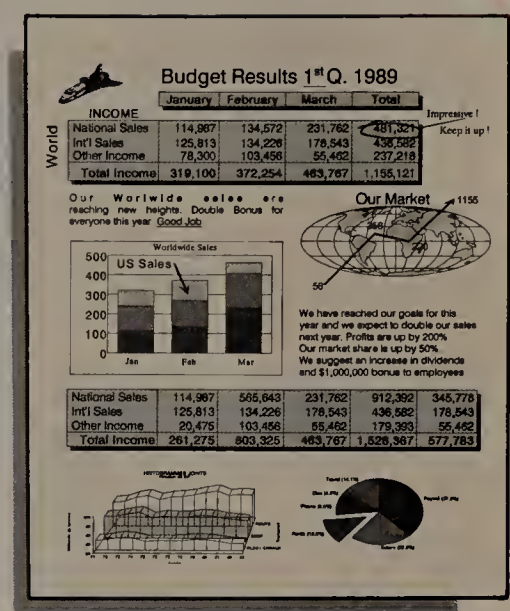
Circle 280 on reader service card

New Version!

New For 1-2-3




*While in IMPRESS you can edit cells and even use all 1-2-3 commands.*




*What you see on your new 1-2-3 screen is what you get on paper.*

*Lotus 1-2-3 stays fully active in graphics mode with IMPRESS. 1-2-3 works just like before, only now you have your own customized 1-2-3 screen display and reports.*

# When your 1-2-3 Worksheet looks IMPRESSive so do You

IMPRESS from PC Publishing gives 1-2-3 true desktop publishing features that enable you to create eye-catching and persuasive worksheets.

## 1-2-3 Stays Fully Active

While in IMPRESS you can call all 1-2-3 commands and menus. You can also edit cells. (Unlike Allways you never need to revert back to text mode for editing cells.)

## Drawing Tool Box with an Optional Mouse Support

IMPRESS brings a true graphic interface to Lotus 1-2-3. Full mouse support to call menus or open windows. Even a drawing tool box that allows you to draw any image in 1-2-3. Get a professional look quickly and easily without ever leaving 1-2-3.

## Compress or Enlarge Worksheets

You can customize your 1-2-3 screen display with drawings, colors, grids and new exciting fonts. You can also zoom in and out to compress worksheets or enlarge them. See twice as many rows and columns of your worksheets on screen. No more scrolling around.

## Mix Numbers, Text and Graphics

Create a professional report with numbers, graphs, images and text all on one page. Your graphs are customized. Your text automatically word wraps and is justified. You have a choice of different type styles and sizes with different fonts (3 pts. to 72 pts.). Many Bitstream Fonts included. Your images are created with the drawing tool box or imported from Freelance.

## Also Prints Sideways

Print sideways with all printers from dot matrix to laser and desk jets. Print exciting colorful reports with color printers. IMPRESS can also compress worksheets automatically so they fit any page size you want.

## Customize Graphs or Forms

Graphs can be real time synchronized with your worksheet. You can also include .PIC files or Freelance files. Customize your 1-2-3 graphs with arrows, explanations, fancy titles and drawings. Draw lines, boxes, grids or even freehand to create any form or invoice from inside 1-2-3. Then fill up your forms on screen and simply print them.

## Easy to Use

If you know how to use 1-2-3, you already know how to use IMPRESS, it's fast and easy. There is no learning period. IMPRESS uses 1-2-3 like menus that you are already familiar with.

## Allways and 1-2-3 Rel 2.0, 2.01, & 2.2 Compatibility

If you have Allways IMPRESS imports Allways files automatically. So you can improve them, print them sideways, or simply work on them without having to toggle to text mode. IMPRESS works with 1-2-3 Rel 2.0, 2.01, & 2.2.

### Technical Requirements

**IMPRESS works with:** *1-2-3 release 2.0, 2.01 or 2.2, DOS 2.0 or later, CGA, EGA, VGA or Hercules (No color in CGA). Supports all graphics printers that work with 1-2-3: including Dot Matrix, Desk Jet, Laser printers (Hewlett Packard, Postscript, etc. . .), Color printers. IMPRESS occupies 93k RAM above 1-2-3 (uses EMS if available). Many Bitstream Fonts included with package. 1-2-3 is a registered trademark of Lotus Development Corp. Allways is a registered trademark of Funk Software.*

| | Allways | IMPRESS |
|---|---|---|
| 1-2-3 stays fully functional & interactive | No | Yes |
| Enhance & customize 1-2-3 screen display | No | Yes |
| Print sideways on all printers | No | Yes |
| Synchronized live graphs | No | Yes |
| See and work with more rows & columns on screen | No | Yes |
| Drawing tool box | No | Yes |
| Import Freelance images or graphs | No | Yes |
| Word processing capabilities | No | Yes |
| Customize graphs with arrows, frames, drawings | No | Yes |
| Full mouse support | No | Yes |

*"Which is better? . . . IMPRESS is the clear winner. It boasts nearly every additional feature I wished for when I reviewed Allways."*
5/16/89 — **PC Magazine**

*"IMPRESS . . . a clear leader worthy of an excellent score. If you like Allways, you'll love IMPRESS."*
9/4/89 — **Infoworld**

*"Works magic . . . the tremendous improvement over 1-2-3's screens and reports is obvious."*
3/89 — **Lotus Magazine**

$149.95

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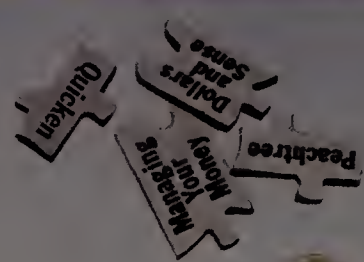
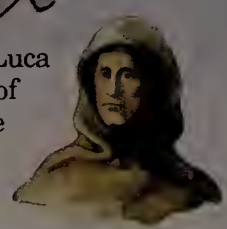
Circle 212 on reader service card

# The Perfect Solution




## to Your Accounting Software Puzzle

only $49.95



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8

**Pacioli 2000 Has What You Need**

- Maintains all detail information for up to 36 accounting periods. You can keep all 36 periods open simultaneously.
- Service based, Inventory based, Cash basis or Accrual basis. Use any or all at any time without losing data.
- Up to 999 companies on-line concurrently
- Transfer account data to your favorite spreadsheet, database or wordprocessor.
- Network ready—add 2 or 200 computers to your network with no additional fee or per-user charge.
- Multi-level password protection, file and record locking, transparent user management and more.
- Easy-to-use with pull-down menus, full mouse support, and context-sensitive help.
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**C.T.P. = Customer Takes Priority™**

Pacioli 2000 fits your needs with these C.T.P. features:

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= **Free Video Tutor**—*Introductory Offer:* 3 FREE video (VHS) programs, a $75 value, teaching you MS-DOS®, Basic Accounting, and Pacioli 2000.

= **90-Day Money Back Guarantee.*** Try Pacioli 2000 for 90 days. If you're not satisfied, send it back for a "no-questions" refund (minus shipping and $10 restocking fee). You can keep the Video Tutor.

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Or send $49.95 plus $7.50 shipping and handling each (Texas residents add 8% sales tax) to:

M-USA BUSINESS SYSTEMS, INC. 18111 Preston Road, Suite 500 Dallas, TX 75252

***Minimum Hardware Requirements:*** IBM or compatible computer, 640Kb, hard disk, mono or color monitor, mouse optional, MS-DOS 2.1 or later for single users (3.1 or later for networks), 132 column printer in compressed mode.

*Money-Back Guarantee only applies to products bought directly from M-USA Business Systems, Inc.

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with the name of your download directory, replacing 'c:\dsz' with the name of your DSZ directory, and pressing **<Ctrl>-G** to create the '^G' for the ECHO commands. Then save the batch files in your *Procomm Plus* directory.

Start *Procomm Plus*, press **<Alt>-S** to bring up the Setup screen, and select *Protocol Options*. Select an unused menu letter and enter **zmodem-u**. Repeat for **zmodem-d**. Return to the Setup screen and choose *Save Setup*. Bring up the Dialing directory with **<Alt>-D**, highlight the name of a BBS that uses ZMODEM, and press **R** to revise it. Press **<Enter>** eight times and select *Ext 1* for the protocol. Repeat for all dialing directory entries for which you want ZMODEM protocol used. Now when connected to those BBS's, Procomm will automatically use ZMODEM.

### Perfect Upgrade

In March's *Help Screen*, the cost of upgrading from *WordPerfect 4.2* or *5.0* to *WordPerfect 5.1* was incorrect—it's $85. While we're on the subject, I'd like to remind readers about WordPerfect Corporation's commendable school donation "experiment": This upgrade package currently includes a license request form and a letter explaining that the purchaser is encouraged to donate his or her *4.2* or *5.0* version to an elementary or secondary school. Upon registration, the school becomes a fully licensed user.

*How does...? What can...? Should I...? Send your PC questions to* The Help Screen; *for details see How to Contact PC World, page 4.* ●

# Introducing the PostScript solution that makes sense

## PostScript emulation for the HP LaserJet IIP, IID and the new LaserJet III printers

If you don't want to spend a fortune on a PostScript® printer, but want the same high quality output and sophisticated graphics, we have a solution for you. *PacificPage Personal Edition*™ is an affordable and easy to use PostScript emulation cartridge for your HP LaserJet IIP, IID*, or III printer. It provides the same high quality output of a PostScript printer and now, even supports Adobe Type 1 downloadable outline fonts. And if you're a Macintosh® user, there's a version available for you too.

Everyone agrees. *PacificPage* is the PostScript solution that makes sense! Here's what they're saying:

*"Users said that PacificPage offers a better combination of reasonable cost and ease of use"*
PC Week, *August 7, 1989*

*"...produces pages that look strikingly better than those produced by a 300-dpi Adobe PostScript printer"*
PC Magazine, *November 28, 1989*

*"PacificPage offers the easiest way to get PostScript output from a non-PostScript laser printer...PacificPage is also the most convenient solution because users can print files in one step, without exiting the application... The ability to scale all 35 fonts to any size and the fact that most, if not all, graphics packages have extensive PostScript support are two reasons to buy PacificPage"*
PC Week, *November 20, 1989*

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*"PacificPage is the easiest to use, highest quality PostScript emulator yet."*
PC/Computing

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40 MB
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80386SX
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1 MB RAM
VGA
14.9 lbs.

The Dell System® 316LT laptop.

Other laptops pale by comparison. An opinion shared by *PC Magazine*, which recently named the Dell System 316LT Editor's Choice.

In fact, they called it "fully formed, functional and smacking of solid technology."

Inside this sleek design there's an intense 16 MHz 386™ SX system with up to 8 MB of RAM, a 20, 40 or 120 MB hard drive, and a 3.5" 1.44 MB diskette drive.

The 316LT also features an expansion slot that accepts any half-length industry standard expansion card.

And a "Continuous Power Battery System" including two batteries that lets you maintain your screen even while you change batteries.

Everything you now enjoy on your desktop, in a laptop. *For under $3500 for a 20 MB system.* With leasing plans as low as $127 a month.**

The Dell System 316LT also comes with support and service rated #1 in 6 out of 6 *PC Week* polls of customer satisfaction, a 30-day, money-back guarantee, and one-year of on-site service. So if you ever have a problem while you're on the road, there'll be a technician from Xerox Corporation, there to service it by the next business day.△ Anywhere in the continental U.S.

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So much for business travel being dull.

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VGA
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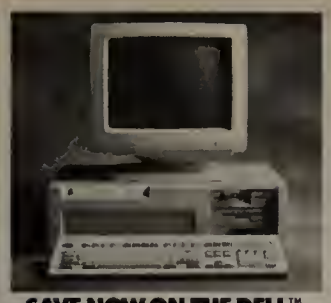

**SAVE NOW ON THE DELL™ SYSTEM® 325 25 MHz 386.**

AN EVEN BETTER VALUE AT THESE LOW PRICES.

STANDARD FEATURES:

- Intel 80386 microprocessor running at 25 MHz.
- Standard 1 MB of RAM, optional 2 MB or 4 MB of RAM* expandable to 16 MB (using a dedicated high speed 32-bit memory slot).
- Advanced Intel 82385 Cache Memory Controller with 32 KB of high speed static RAM cache.
- Page mode interleaved memory architecture.
- VGA systems include a high performance 16-bit video adapter.
- Socket for 25 MHz Intel 80387 or 25 MHz WEITEK 3167 math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Dual diskette and hard drive controller.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 200-watt power supply.
- 8 industry standard expansion slots (6 available).

*****Commercial Lease Plan. Lease for as low as $145/month.***

***△Xerox Extended Service Plan pricing starts at $370.***

| | |
|---|---|
| 40 MB VGA Monochrome System | $3,999 |
| 100 MB VGA Color Plus System | $4,899 |
| 100 MB Super VGA Color System (800 x 600) | $4,999 |
| 150 MB Super VGA Color System (800 x 600) | $5,499 |

Prices listed reflect 1 MB of RAM. 80, 150 and 322 MB hard drive configurations also available.

THE NEW DELL SYSTEM® 316LT

This new full-featured, battery powered 386SX laptop costs less than most 286 laptops.

STANDARD FEATURES:

- Intel 80386SX microprocessor running at 16 MHz.
- Standard 1 MB of RAM, optional 2 MB of RAM* expandable to 8 MB (on the system board using 1 MB SIMMs).
- LIM 4.0 support for memory over 1 MB.
- Adjustable and detachable 640 x 480 VGA Liquid Crystal Display.
- One industry standard half-size 8-bit expansion slot.
- Socket for 16 MHz Intel 80387SX math coprocessor.
- 3.5" 1.44 MB diskette drive.
- 83-key keyboard with embedded numeric keypad and separate cursor control keys.
- 1 parallel, 1 serial, and external VGA monitor port.
- Connector for 101-key keyboard or numeric keypad.
- Two removable and rechargeable NiCad battery packs utilizing Dell's "Continuous Power Battery System" (patent pending).
- AC Adapter.

*****Commercial Lease Plan. Lease for as low as $127/month.***

***△Xerox Extended Service Plan pricing starts at $303.***

| | |
|---|---|
| 20 MB, 1 MB RAM | $3,499 |
| 20 MB, 2 MB RAM | $3,699 |
| 40 MB, 1 MB RAM | $3,799 |
| 40 MB, 2 MB RAM | $3,999 |

***Performance Enhancements: Within the first megabyte of memory, 128 KB (316SX, 316LT and 210), 384 KB (325) of memory is reserved for use by the system to enhance performance. Can be optionally disabled on 316SX and 210. 4 MB configurations available on all systems. Call for pricing.** All systems are photographed with optional extras. All prices and specifications are subject to change without notice. Dell cannot be responsible for errors in typography or photography. **Payments based on a 36-month, open-end lease. Leasing arranged by Leasing Group, Inc. In Canada, configurations and prices will vary.

# TELL US WHAT TO DO NEXT.

For your free Dell product catalog, write us. Or call 800-426-5150. In Canada, call 800-387-5752.

☐ Please have a Dell representative call me.

Name: (M ) _____
Please Print

Title: _____

Company: _____

Address: _____

City: _____ State: _____ Zip: _____

Type of Business: _____

Approx. # of Employees in Company: _____

Home Phone: ( ) _____

Business Phone: ( ) _____

1. Which products are you most interested in?
   A ☐ 286-based systems
   B ☐ 386™-based systems
   C ☐ 386SX-based systems
   D ☐ UNIX-based systems
   E ☐ Laptops
   F ☐ Other
2. Are you interested in computer products for:
   A ☐ Home B ☐ Business
3. How many PCs do you (your company) plan to purchase in the next twelve months?

| Timeframe | Quantity |
|---|---|
| A ☐ Less than 1 month | _____ |
| B ☐ 1-3 months | _____ |
| C ☐ 3-6 months | _____ |
| D ☐ 6-12 months | _____ |
| E ☐ More than 12 months | _____ |

4. How many PCs do you have installed now? _____
5. Are you a (select one):
   A ☐ End user
   B ☐ Consultant
   C ☐ Reseller
   D ☐ Corporate Purchaser
   E ☐ DP/MIS Purchaser
   F ☐ Government Purchaser
   G ☐ Other: _____

DELL COMPUTER CORPORATION

AD CODE 51DEO

THE NEW DELL SYSTEM® 316SX
16 MHz 386SX.

The perfect low profile mainstream computer, combining 386SX power and compatibility with unprecedented value and support.

STANDARD FEATURES:

- Intel 80386SX microprocessor running at 16 MHz.
- Standard 512 KB of RAM, optional 640 KB, 1 MB or 2 MB of RAM* expandable to 16 MB (8 MB on the system board).
- Page mode interleaved memory architecture.
- LIM 4.0 support for memory over 640 KB.
- Integrated diskette and high performance 16-bit VGA video controller on system board.
- Socket for Intel 80387SX math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Integrated high performance hard disk interface on system board.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 3 full-sized 16-bit AT expansion slots available.

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△*Xerox Extended Service Plan pricing starts at $196.*

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|---|---|
| 20 MB VGA Monochrome System | $1,899 |
| 40 MB VGA Color Plus System | $2,399 |
| 40 MB Super VGA System (800 x 600) | $2,499 |
| 100 MB Super VGA System (800 x 600) | $3,099 |

Prices reflect 512 KB of RAM. 640 KB versions of the above systems are available for an additonal $50, 1 MB versions for an additional $150, and 2 MB versions for an additional $300.

THE DELL SYSTEM® 210
12.5 MHz 286.

The price says it's an entry-level system. The performance says it's a lot more.

STANDARD FEATURES:

- 80286 microprocessor running at 12.5 MHz.
- Standard 512 KB of RAM, optional 640 KB, 1 MB or 2 MB of RAM* expandable to 16 MB (6 MB on the system board).
- Page mode interleaved memory architecture.
- LIM 4.0 support for memory over 640 KB.
- Integrated diskette and high performance 16-bit VGA video controller on system board.
- Socket for Intel 80287 math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Integrated high performance hard disk interface on system board.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 3 full-sized 16-bit AT expansion slots available.

***Commercial Lease Plan. Lease for as low as $61/month.***

△*Xerox Extended Service Plan pricing starts at $179.*

| | |
|---|---|
| 20 MB VGA Monochrome System | $1,599 |
| 20 MB VGA Color Plus System | $1,899 |
| 40 MB VGA Monochrome System | $1,799 |
| 40 MB VGA Color Plus System | $2,099 |

Prices listed reflect 512 KB of RAM.

640 KB versions of the above systems are available — additional $50, 1 MB versions — additional $150, and 2 MB versions — additional $300. 100 MB hard drive configurations also available.

TO ORDER CALL
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AD CODE 11DEO

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# Now you can change programs on your computer just as easily.

"Click," spreadsheet.
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"Click," database.

Imagine. Now you can change from one software program to another just like changing channels on your television. With Software Carousel,® it's that easy.

No more saving files, exiting programs, loading new programs and retrieving new files, every time you need to change applications.

Simply load your programs in the morning (it handles up to twelve at a time). Then "click" from one to another all day long.

Over to word processing for a quick memo. Into your spreadsheet for budget work. Off to your database for a mailing list update. Return to your word processor, and it's ready to go back to work, right where you left off.

Or load several sessions of the same program, each with a different file, pop back and forth, and work on several spreadsheets, documents, or anything else, all at once.

**Why didn't someone do this before?**

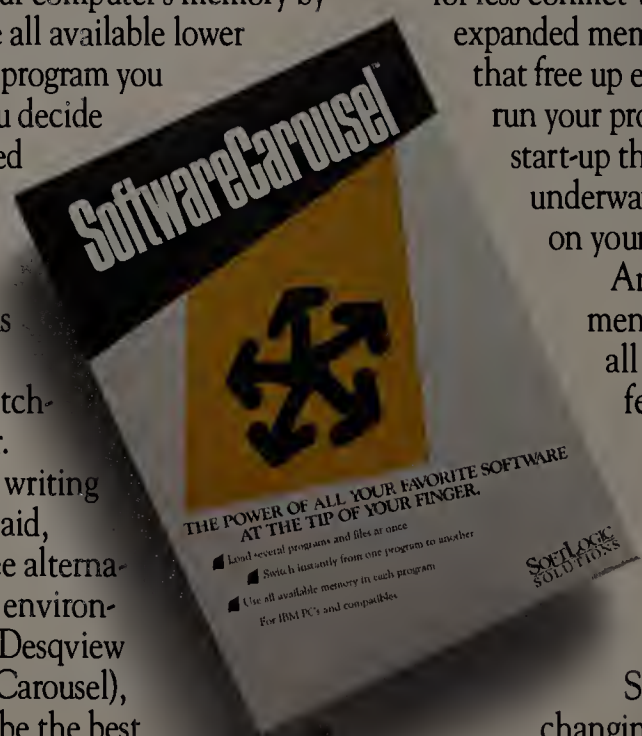
Actually, a lot of people tried. But what they ended with were a bunch of fancy software "environments" that eat up memory, change the way you work, and boggle the mind with complexity.

Plus, a lot of them make you buy new "compatible" software applications. Some even make you buy a bigger computer.

Software Carousel, on the other hand, works with the programs you already own. So you can go on using 1-2-3, WordPerfect, dBASE, SideKick, any program that runs on the computer you use right now. In an absolute minimum of memory. Without changing anything about the way your software runs.

Best of all, Software Carousel makes the most of your computer's memory by letting you use all available lower RAM in each program you use. And if you decide to add extended or expanded memory, Software Carousel works with that too, and makes switching even faster.

Garry Ray, writing for PC Week said, "Of these three alternative operating environments (OS/2, Desqview and Software Carousel), Carousel may be the best choice of the day."




**NEW RELEASE 4.0**
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This is the fourth major release of Software Carousel, and we think you're going to like the improvements.

Like full support for graphics programs. A new simpler-than-ever interface screen, and complete on-line Help.

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And a new customization menu where you can tailor all of Software Carousel's features and options exactly the way you want them.

Best of all, Software Carousel is still just $89.95 at your software dealer, or direct from SoftLogic Solutions.

So sit back, relax, and start changing programs the easy way. With Software Carousel.

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**Circle 23 on reader service card**

# CONSUMER WATCH

**Advice and information for the computer consumer**

Paying by credit card gives you extra protection when PC hardware and software don't live up to your expectations.

*Roberta Furger*

### What to Do After You've Said "Charge It"

When you're buying PC hardware and software, it pays to use a credit card. In fact, doing so may mean the difference between paying for an unsatisfactory product or an item you never received and getting a full refund.

Let's say, for example, you order a PC for a great price only to find that it's DOA. In the best of circumstances, all you should have to do is notify the seller of the error in order to get either the right merchandise or a refund. But what if you can't get the problem resolved? What if you return the item, but your account never gets credited, or you can't return the unwanted merchandise because no one returns your calls?

Well, provided you've made a reasonable effort to straighten things out, you're covered under some little-known but powerful laws that fall under the Consumer Credit Protection Act.

#### Billing Errors

One of your options is to identify the charge as a *billing error.* Billing error provisions cover a variety of circumstances, including correcting charges for items you do not *accept.* This term means more than simply refusing delivery of a product, according to Howard Strong, a Southern California attorney and author of *Credit Card Secrets You Will Surely Profit From* (The Boswell Corporation, Beverly Hills, California, 1989).

"Acceptance...means that [the product] met all the requirements of your deal with the seller," he says. So if you order a 20-MHz 386 but receive a 16-MHz system, or if the PC you ordered gets delivered in three weeks despite the salesperson's guarantee of 48-hour delivery, you probably don't have to accept it. And if you don't, you're well within your rights to declare the charge a billing error, says Strong.

A phone call to your credit card company should provide you with all the information you need on how to correct a billing error, but these are the guidelines.

- You must notify the credit card company *in writing* of a billing error within 60 days of when the statement was mailed. Your letter must include an explanation of why you consider the charge a billing error.
- Your account number should be referenced in the letter, which must be sent to the address specified for all billing inquiries. Note: This may be a different address from the one to which you send your payments and is usually listed on your statement.
- Strong suggests sending the letter by certified mail, return receipt required, so you have proof of when the letter was sent and received.

Once the letter is received, the credit card company has two options: It can correct the bill within 30 days, or it can notify you in writing that it is investigating your complaint and will resolve the problem within 90 days or two billing periods (whichever is shorter).

It's up to the credit card company to prove that the contested item is *not* a billing error. Once you've sent the original letter, you aren't required by law to do anything further to invoke your rights, according to Strong.

Following the proper procedures doesn't necessarily mean that the item will be re-

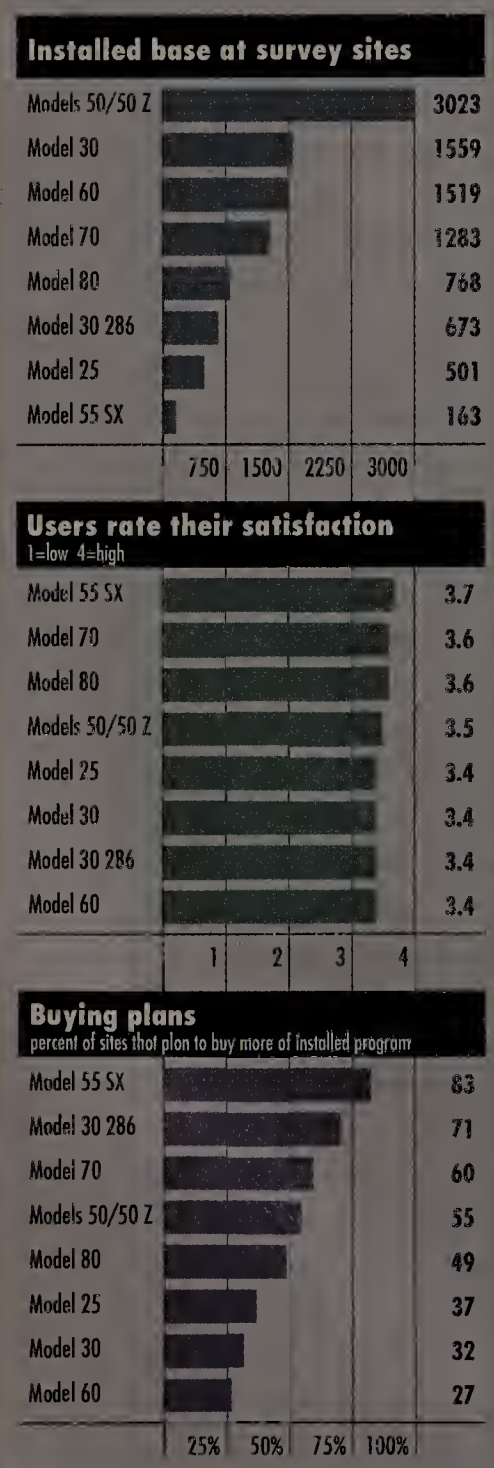
*(continues)*

ANTHONY RUSSO

## RATE YOUR SATISFACTION: IBM PS/2 Computers

In keeping with the demand for powerful, affordable systems, IBM's PS/2 Model 55 SX, based on the Intel 80386SX chip, tops the charts when it comes to buying plans and user satisfaction, according to this survey.

At the opposite end of the spectrum is IBM's Model 60, which has one of the largest installed bases of users of any PS/2. Fewer companies plan to buy this high-end 286 than any other PS/2, including the 8086-based Model 30. The Model 60 was also among the lowest-rated PS/2 systems in terms of user satisfaction.




*Source: International Data Corporation. From a survey conducted in November 1989 of 200 large organizations, each with at least 50 PCs.*

moved from your account, however. You might get additional letters asking for more information, or on further investigation the credit card company may disagree with your assessment and hold you liable for the charge.

"If the credit card company does not agree with you, you can fight on to get the error fixed," says Strong. "Fighting on" can mean anything from launching a full-scale legal battle to writing the government agencies that oversee the activities of credit card companies.

### Stopping Payment

But what if the 60-day time limit on notifying the credit card company has come and gone, and you've lost the right to have your account credited under the billing error provisions? Your next line of defense, according to Strong, is the good-faith stop-payment rule, which can be used *anytime* after an item is charged.

Under this section, if you receive incorrect or faulty merchandise and have tried to correct the matter with the seller, you have the right to stop payment on the charge. (Having done so, you must, however, make every effort to return the merchandise.)

Although the law states no time limits, there are some noteworthy caveats: You must have attempted to settle the problem *before* making any portion of payment. Also, the good-faith stop-payment rule applies only to purchases that are over $50 and are made either in your home state or within 100 miles of your billing address. But Strong says the distance limitation doesn't necessarily apply to items purchased over the phone or by mail.

Citing a noted authority in contract law, Strong says the location you are in when you buy something over the phone is the place of purchase. If you order from home, you're obviously within 100 miles of your billing address.

"The same rule applies when you mail a stamped letter. The place of purchase is where you mail the letter," he adds. Be aware that this is Strong's interpretation, however, and one that not everyone agrees with.

According to Strong, your rights under the good-faith stop-payment provision are absolute and do not depend on your providing any additional information to or having further correspondence with the card company.

All you have to do is make an effort to work the problem out with the seller. If those efforts are fruitless, you then notify the card company *in writing* of your desire to stop payment.

In a *charge-back*, the card company takes back the money it had earlier credited to the merchant's account and sends a note to the merchant saying "solve this problem," explains Strong. "If you eventually get your problem resolved and tell the card company so, the company gives the seller back the money. If you do not resolve your problem, the company does not charge your account and the merchant gets nothing."

Even if the card company can't get the money back from the seller, "you still get *your* money back," says Strong. In the case of bankruptcy, for example, the credit card company should absorb the loss.

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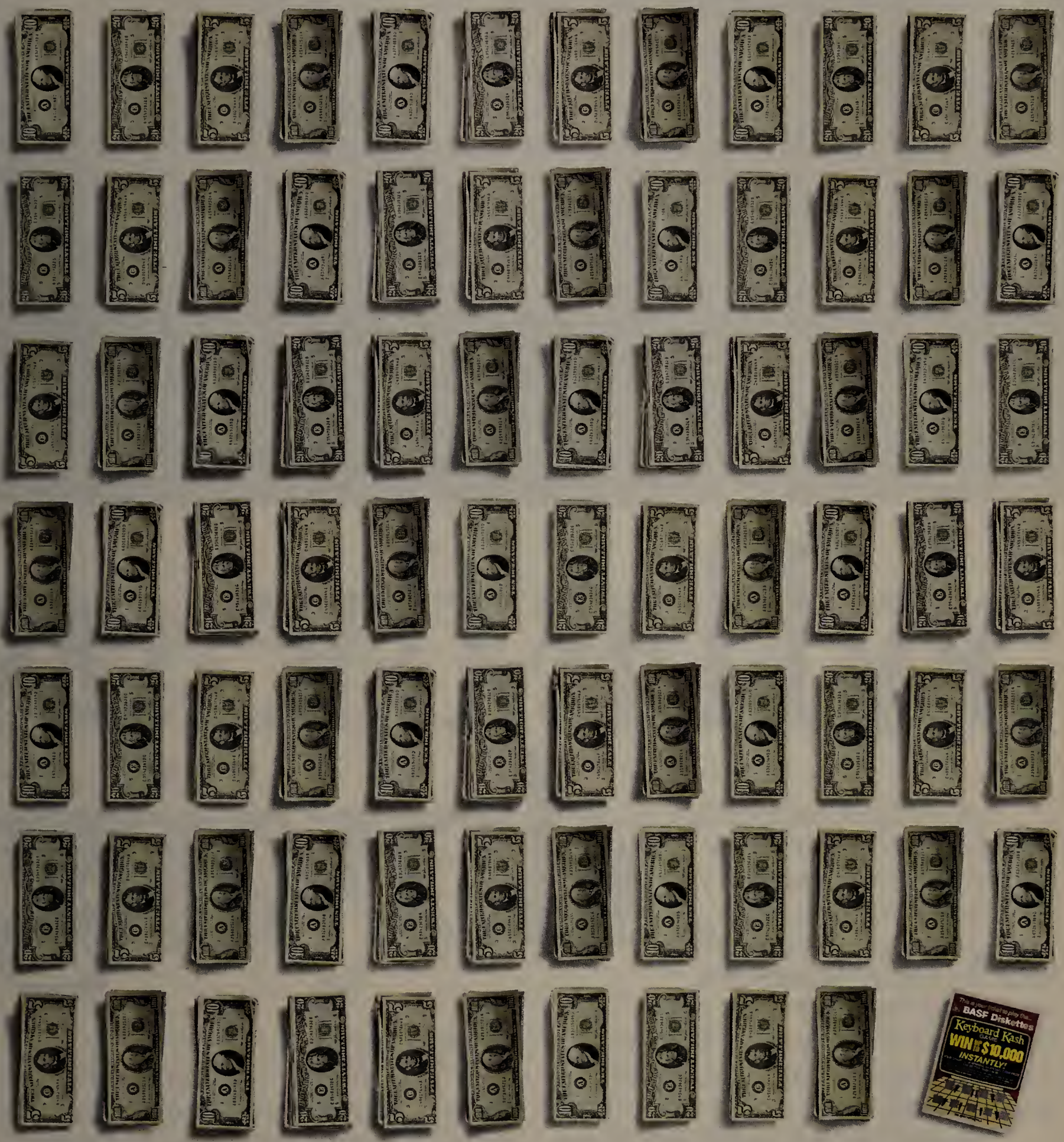

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**Circle 25 on reader service card**


The final weapon in your credit card arsenal is the 60-day stop payment. This works much like the good-faith stop but, as the name implies, must be done within 60 days of when the bill is mailed. Here the dollar and distance limitations do not apply.

The card company must either credit your account within 30 days or include on your next statement a notice that you are not required to pay the disputed amount. Your account must be credited within 90 days or the card company must inform you why it is not being credited.

So which option should you use? While Strong says your rights are stronger under the billing error provisions of the law, he advises that when in doubt, "use both your billing error and stop-payment rights." And document all conversations and correspondence with both the card company and the seller.

Whichever option you use, the bottom line is that you're refusing to pay for an item. If the credit card company agrees with your assessment and deducts the disputed amount from the seller's account, you may find yourself hounded by an angry merchant. And should the card company disagree with you, it too can make things rough for you, including reporting you delinquent on your account (although it must also state that the charge is in dispute).

But Strong says such dire consequences rarely occur, noting that 75 percent of the time things get cleared up to the customer's satisfaction.

## SHOP TALK

### Schemers Indicted for Mail Fraud

Nearly three years after postal inspectors first became aware of a computer scam perpetrated by CompuSystems of Beverly Hills, California, the owners of the bogus company have been indicted for mail fraud, according to Burbank, California, postal inspector Gary Austin.

Approximately 400 people lost an average of $450 each after responding to ads placed in several computer publications for discounted hardware and software.

The owners "never had any intention of selling anything," says Austin, adding that the suspects ran ads offering products at 25 percent less than the prices in other, legitimate ads.

Unfortunately for the victims, however, Austin estimates that there's only a 50 percent chance of anyone recouping their losses.

If any money is collected, Austin says his office will return it to the victims based on a percentage of their loss.

### Samsung's Slow Response

In September 1988 I ordered a Samsung Multisync monitor. While still under warranty, the monitor failed.

I took the monitor to Tandy Customer Repair Service in Tulsa and was advised that repairs would take four to six weeks. Later, however, it was determined that the monitor was not repairable. Tandy sent it back, and I returned it to Samsung for a replacement, which I received 83 days after the first one failed. The replacement was not in as good condition as my original monitor, and now, nine days later, it too is defective.

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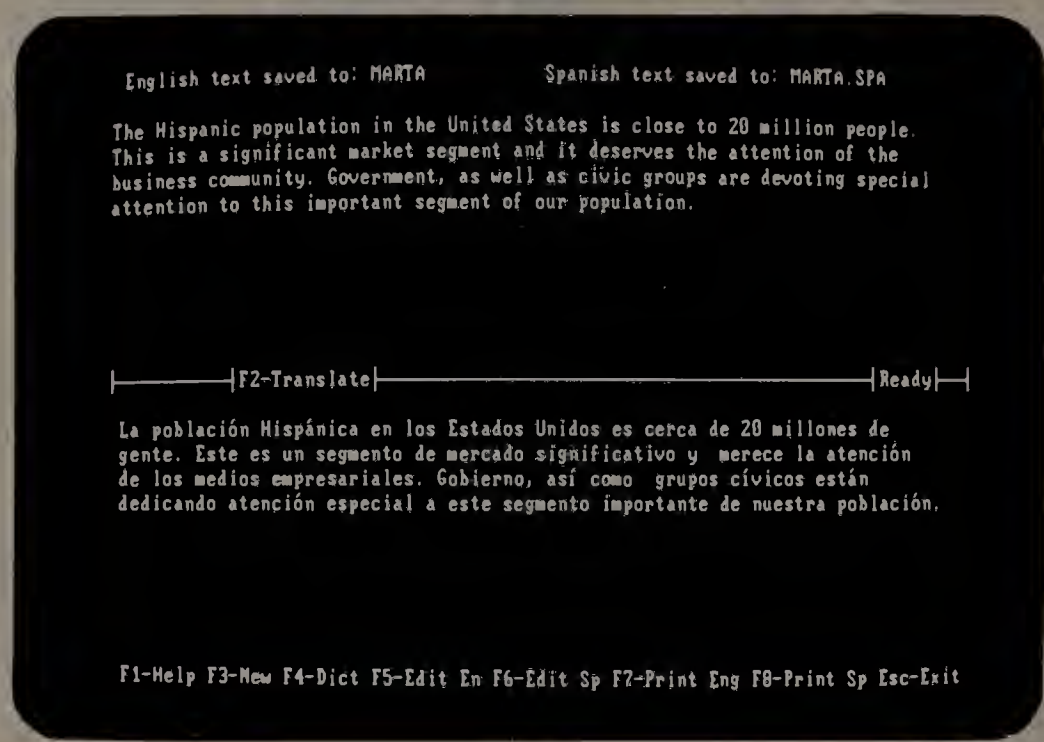


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Circle 84 on reader service card


vised that the monitor was covered under the 30-day warranty service. But until I get a new replacement, I will again be without a monitor. I wonder how long it will be before Samsung finally gets it right.

*Phil Bell*
*Barling, Arizona*

*Editor's note: According to Samsung's customer affairs supervisor, Samsung was unaware of Mr. Bell's problem until she received a copy of his letter to* Consumer Watch. *She adds that Mr. Bell has now received a new unit, along with a new one-year warranty.*

*But Mr. Bell says he's "not convinced about Samsung. It took them too long [to straighten things out].*

### Astonishing Service

Having recently suffered an unprintable problem with a mail-order computer dealer, I am pleased to report a very happy experience with a different supplier.

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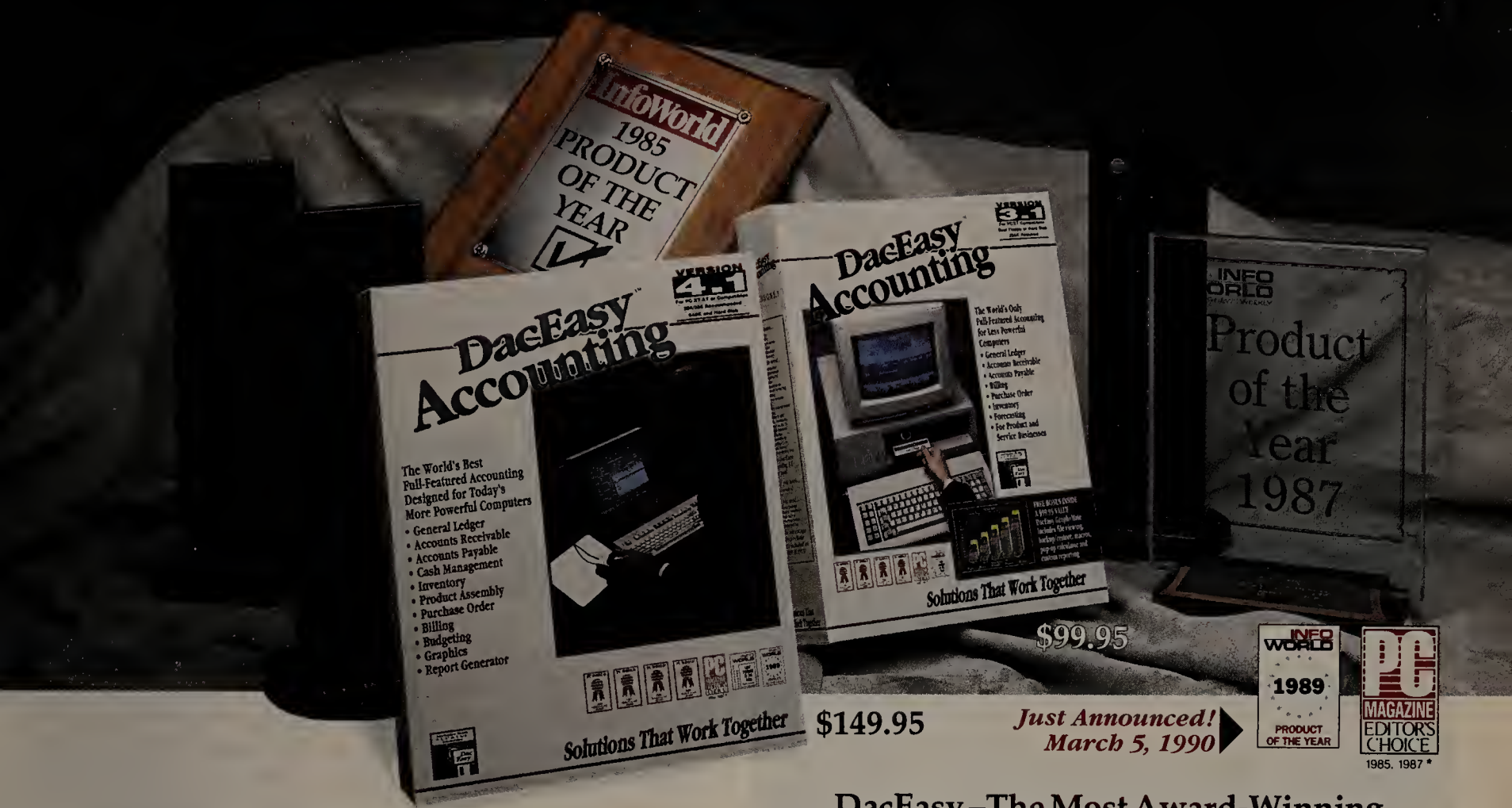


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*DacEasy Accounting was voted PC Magazine's Editor's Choice in 1985 for Version 1.0 & 1987 for Version 2.0.•

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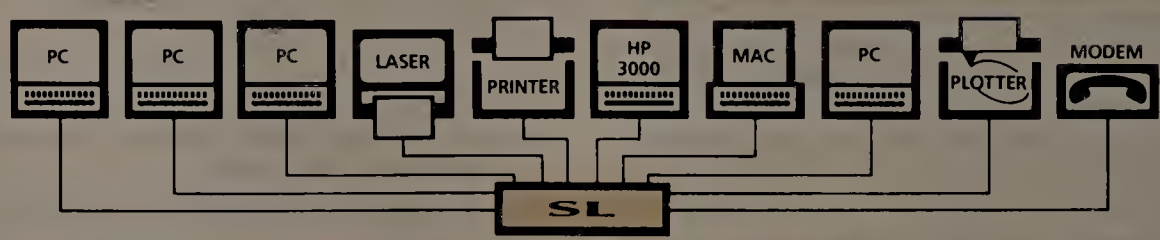


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*Edited by* ERIC BENDER

**Pushing Into Overseas Markets**

# PC Vendors Prepare for Leaner Times

## *Clone Makers Struggle to Stand Out From Crowd*

The easy times are gone. Virtually every PC manufacturer has been hit by lower profits and forced to reevaluate its strategy.

Symptoms of the slowdown are everywhere. No-name, no-bankroll clone makers are declaring bankruptcy. Two of the major players, Wyse Technology and Zenith Data Systems, stumbled through 1989 and went on the auction block. Apple and IBM are cutting staff, and even the usually high-flying Compaq is seeing its earnings dip.

The vast majority of familiar companies are getting squeezed into the second tier between the market leaders and the no-name–clone makers, says Bill Lempesis, a senior analyst with Dataquest in San Jose, California. Struggling to distinguish themselves, second-tier firms stress marketing and distribution, vying for shelf space and offering promotions. But slick marketing campaigns alone won't do the trick—companies need to find niches, says Lempesis.

At Everex in Fremont, California, that means stressing high-performance systems, while Wyse stakes out a claim in the multiuser system category. At Dell Computer in Austin, Texas, it means pursuing the fast-growing laptop market plus offering systems integration and other value-added services, says chief executive Michael Dell.

Everywhere, it means tightening the belt. "During a boom period, companies basically just have to manage growth," says Bruce Stephen, an analyst with International Data Corporation (IDC) in Framingham, Massachusetts. "When things slow down, it tests their business basics. There are still a few companies in the second tier who are vulnerable."

One PC maker that's managed to switch gears is AST Research. The Irvine, California, manufacturer had a dismal fiscal year ending June 30 but achieved a solid turnaround over the next two quarters. Jim Ashbrook, senior vice president of marketing, attributes the gains to clamping down on expenses and divesting itself of noncore product lines.

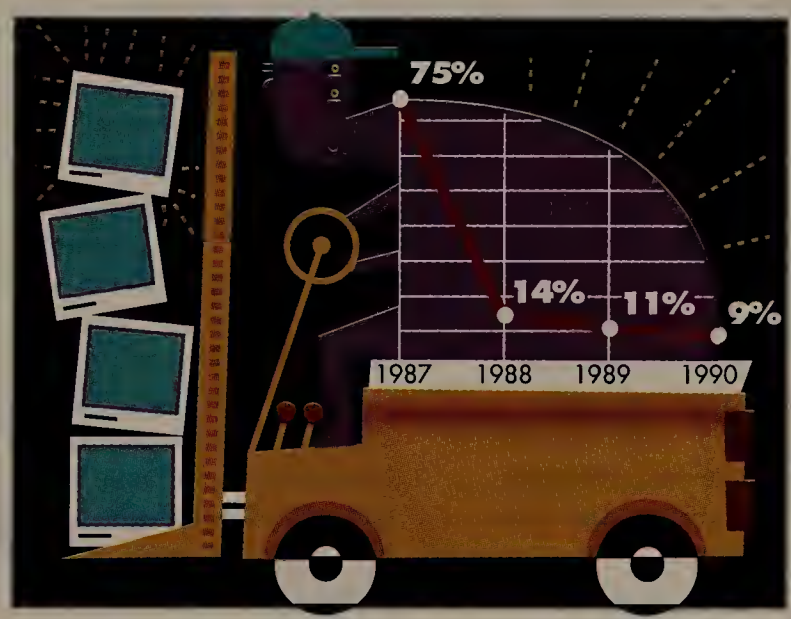
In contrast, Everex continues to offer a huge array of systems and peripherals. "Our strength historically has been in engineering and in our channel of distribution," says Alan Bushell, vice president of operations. The company sells only to dealers and value-added resellers, and stocks little finished inventory, adjusting production day by day to meet phoned-in orders.

Many companies are investing overseas, where demand remains strong. Dell, for example, has subsidiaries in Canada, West Germany, France, Sweden, and England. AST opened subsidiaries in Italy, Switzerland, and Australia and sales offices in Japan and China during fiscal year 1989.

Although game plans differ, many PC suppliers including Dell and Everex plan to capitalize on hot products like laptops. Lempesis cautions, however, that many laptop entrants will be plagued by the same distribution limitations that hamper sales of desktops.

IDC's Stephen says purchasers worried about the long-term viability of their supplier should play it safe by sticking with market leaders. Beyond that, though, he says it's a good time to buy: "You're getting more bang for your buck." And leaner times mean good news for some consumers whose suppliers now increasingly emphasize value-added features, such as cost-effective upgrade solutions and increased service and support. —*Roberta Furger*

### Limits to PC Growth




International Data Corporation figures show that the phenomenal double-digit growth in U.S. shipments of PCs is finally tapering off, forcing manufacturers to revise their strategies and seek new markets.

GORDON STUDER

# Ink Jets Take Over—Quietly

## *HP's DeskJet Is Runaway Leader*

**Unlike its 24-pin dot matrix competitors, Hewlett-Packard's DeskJet Plus produces laserlike output.**

Nothing shabby about today's 24-pin dot matrix printers—they're quick, the type quality is fine for business letters, they're aggressively priced, and you almost need a sledgehammer to break them. But Hewlett-Packard's black-and-white ink jet printers are rapidly taking sales away from the 24-pins, thanks to their much quieter operation and laserlike text and graphics.

HP's ink jet sales are growing even faster than its laser sales; the millionth HP ink jet sale was recorded early in 1989. Hewlett-Packard's dump-dot-matrix crusade began two years ago with the DeskJet, its first 300-dot-per-inch model. HP still sells this model, but a better deal is the year-old DeskJet Plus. Offering 2-page-per-minute speed and stronger font support, the Plus sells on the street for $500 (after a $150 rebate available through June).

DeskJets target "people who are ready to move away from dot matrix printers but are constrained by price from moving to lasers," says Duane Schulz, product marketing manager at HP's Vancouver, Washington, division. This market translates into small business and home use where print volume isn't important and high-quality text and graphics are desired. In addition to ten built-in fonts, DeskJets accept font cartridges and downloaded soft fonts; says Schulz, "the average user buys one font cartridge."

High-resolution ink jet sales will grow 50 percent this year, and HP enjoys more than 90 percent market share, says Marc Boer, analyst with BIS CAP International in Norwell, Massachusetts. Boer and other analysts doubt that HP will be seriously threatened soon. The strongest challenger to date, Canon's Bubblejet, lacked laserlike features such as sheet feeding, remarks Jim Upham, director of electronic printer service at Dataquest. Canon could challenge again, but for other vendors, adds Upham, "ink jet technology is much more difficult to copycat than a basic laser engine."

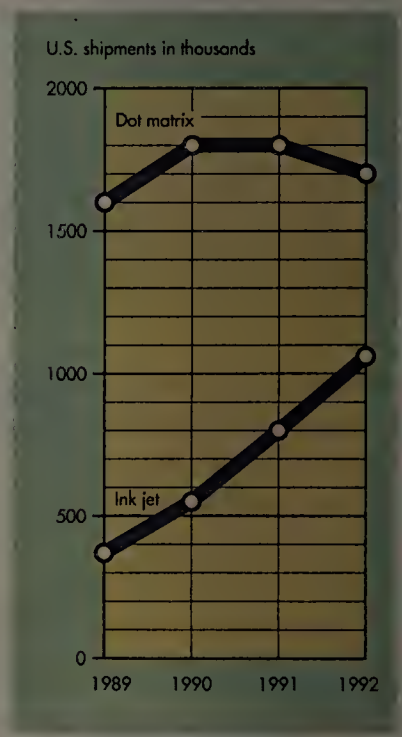
Meanwhile Epson, Panasonic, IBM, and other 24-pin printer manufacturers are not focused on HP's challenge. "They're having enough trouble [competing] with 9-pin suppliers," Upham explains. "But if 24-pins go upscale, they'll have to go head-to-head against DeskJet features." Dot matrix printers could be redesigned for fancier fonts and graphics, but they'd have to support other standards like DeskJet or even LaserJet languages.

Dot matrix models still hold the edge not just on draft-quality speed but on cost of ownership—ink jets run silent but not cheap. A replaceable ink cartridge (which includes the printhead) lists at $20 and gives roughly 500 double-spaced pages. Schulz says the average cost of ink jet consumables is 5 cents a page—higher even than laser printers' 3 to 3.8 cents. On the other hand, most DeskJet users print in small volume, so cost of consumables isn't a major factor. On the reliability front, HP quotes a mean-time-between-failure rate of 20,000 pages and offers a three-year warranty.

BIS CAP expects that by year-end, HP will introduce a cheaper DeskJet positioned against 9-pin printers, with continuous-feed paper. At the top of the line, though, DeskJets already bump into the LaserJet IIP (thus the $150 rebate). "HP's willing to take lower margins in order to assure its lock on the low-end marketplace," comments IDC analyst Sharon Kern.

Future ink jets could support higher resolutions and gray-scale output, but analysts expect HP to concentrate development efforts on two other fronts. The first is a successor to the DeskJet's water-soluble ink, which runs if you wet the paper and smudges with too much handling. Second is development of color models with higher resolutions than HP's PaintJet. Schulz says resolution itself isn't a problem; the challenge is "to do really high-quality color on plain paper." —*E. B.*

## Ink Jets Challenge Dot Matrix Printers




Soles of high-resolution block-and-white ink jet printers are on o roll, according to BIS CAP Internotionol. The quiet, loser-quality devices ore doing increosingly well ogoinst 24-pin dot matrix printers (whose overall sales ore peaking). Hewlett-Packard enjoys over 90 percent market shore for this type of ink jet.

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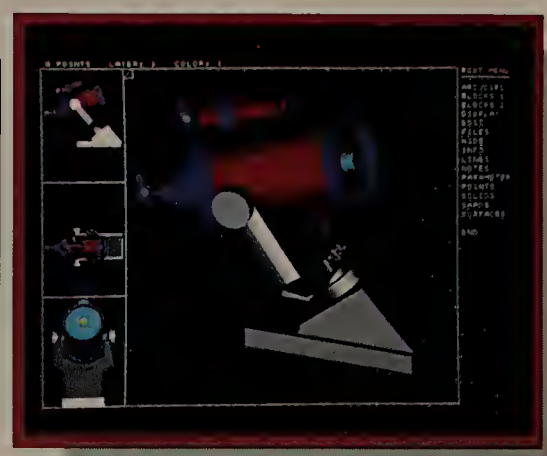

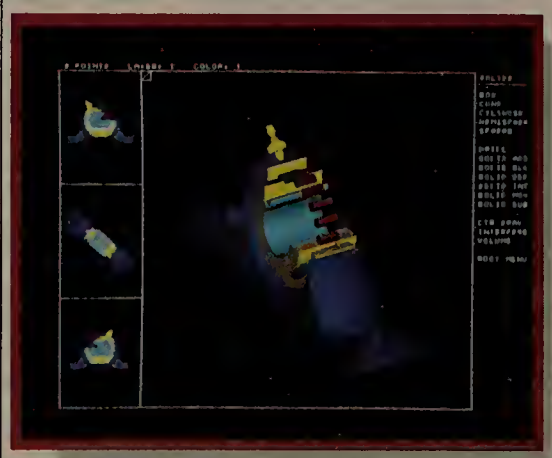

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Circle 306 on reader service card

# Contact Managers Find New Calling in Business

## *Highly Structured Software Moves Beyond Sales Jobs*

Selling contact-management software to computerphobic salespeople is your classic high-risk/high-opportunity business venture. The scores of companies in this niche are small and undercapitalized, with one exception—Contact Software International of Carrollton, Texas. With more than 30 employees and 80,000 installations of its $395 *Act* program, Contact substantially outdistances its rivals and even sees its package on some best-seller lists.

President Pat Sullivan was a retail computer salesman in the early 1980s when he created *Act*'s predecessor as a *Symphony* template, designed primarily to prepare sales bids. Colleagues liked the way it helped track leads, follow up on contacts, and manage sales calls. Sullivan started a business with a colleague to offer the templates, but soon they decided contact management was the way to go. In 1986 they raised venture capital to produce the first *Act*.

When it appeared in early 1987, the market was already crowded with similar products, and *Act* lacked the necessary auto-dialer. But Sullivan had dollars for advertising and quickly found wide distribution. Not long after *Act 1.1* debuted in late 1987—complete with auto-dialer—it took the leading role.

A prototypical contact manager, *Act* helps schedule and track calls and builds a data base of notes from calls and meetings. An alarm prompts you to make preplanned calls, signalling you even from within other applications. The software also includes E-mail and fax capabilities plus a word processor for follow-up letters or telemarketing scripts.

While *Act* may sound like a personal information manager (PIM), it resembles PIMs only superficially. Most PIMs are more free-form, while the contact manager is a highly structured data base. Additionally, most PIMs are simply not contact oriented—lacking auto-dialers, for instance.

The sales profession has steadfastly resisted the spread of computers, so the next *Act* will add a text-based windowing interface expected to make it easier to learn.

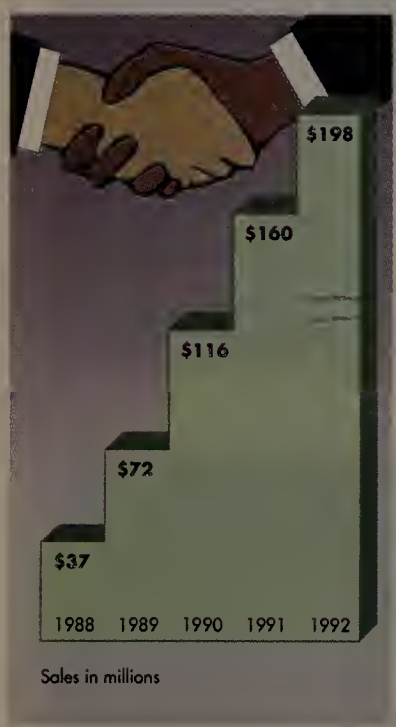
*Act* also lacks a network version. Sullivan says his strategy has been to appeal to individual salespeople who buy it retail, but competitors with network versions say this deficiency has made *Act* easier to follow. "We get many customers converting to us from *Act* just because they can't get a network version," says Thomas O'Flaherty, president of Richmond Technologies & Software, of Burnaby, British Columbia. Richmond's *Maximizer 2.0* is among *Act*'s biggest competitors.

But most observers tie contact management's rise in popularity not to networks but to the recent surge in laptops. "If you'd asked me three years ago if this was going to happen, I'd still have been skeptical," says Harry Gilliam, president of Sales & Marketing Systems of Vienna, Virginia, who has marketed *SalesCTRL* contact management software since 1983. "But [the market] has really turned in the last 18 months."

Invented by salespeople for salespeople, *Act* now finds 70 percent of its users in other fields. After all, everybody has contacts, and if you're dealing with over 100 regular contacts, paper becomes unmanageable. "It's wonderful to get a call from a guy two years after you last talked to him and instantly look up everything you said," says Sullivan. —*Mark Henricks*

**While Contact Software's Pat Sullivan concentrates on individual buyers, his rivals push network versions.**

## Contact Trackers Hit Stride




PC-based contact-management software helps you schedule calls ta ar meetings with clients and track the results. Market Intelligence Research Ca. predicts steady growth for these packages, which are gaining graund amang salespeaple.

LES WOLLAM

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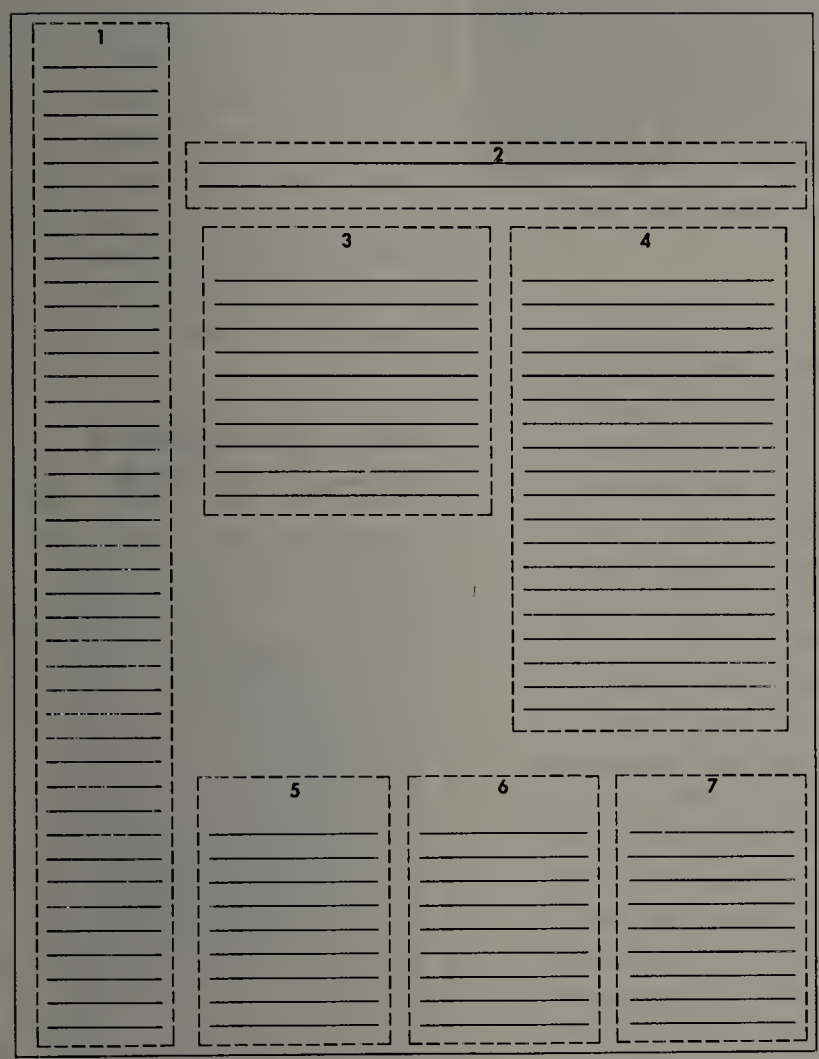


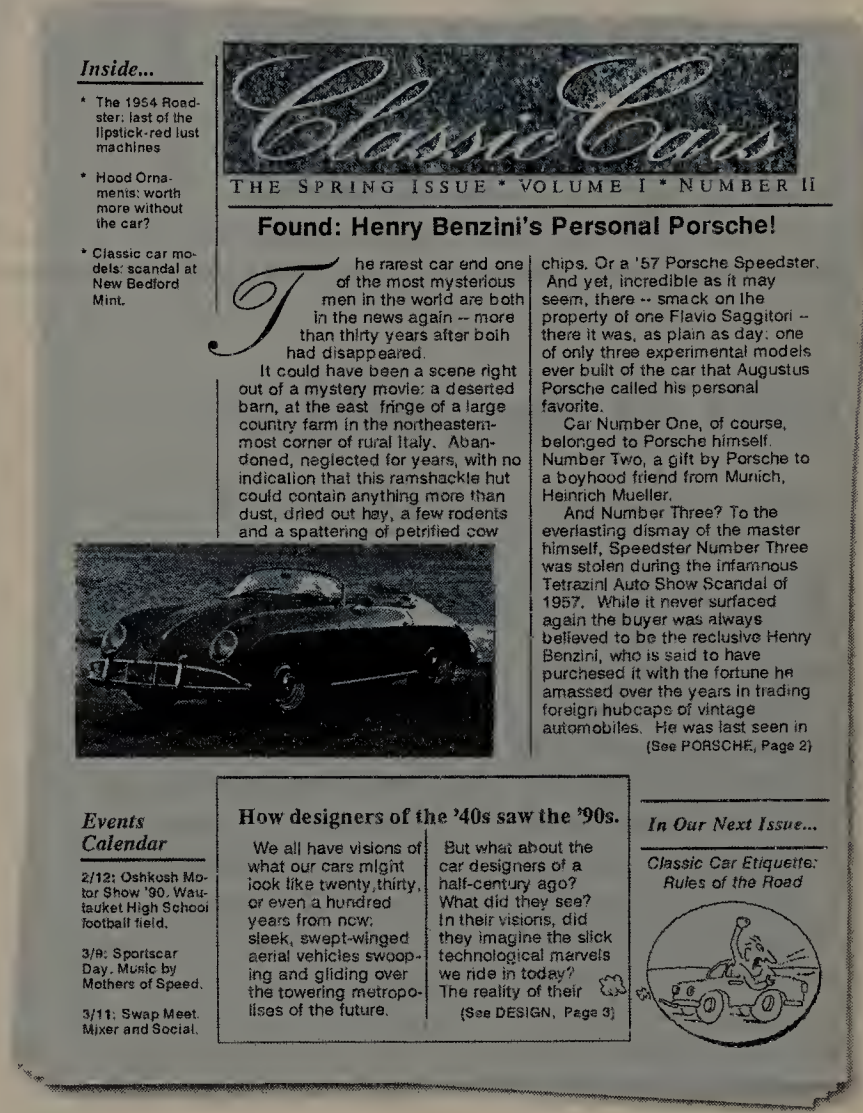

*Inside...*

* The 1954 Roadster: last of the lipstick-red lust machines
* Hood Ornaments: worth more without the car?
* Classic car models: scandal at New Bedford Mint.

Classic Cars

THE SPRING ISSUE * VOLUME I * NUMBER II

**Found: Henry Benzini's Personal Porsche!**

The rarest car and one of the most mysterious men in the world are both in the news again -- more than thirty years after both had disappeared.

It could have been a scene right out of a mystery movie: a deserted barn, at the east fringe of a large country farm in the northeasternmost corner of rural Italy. Abandoned, neglected for years, with no indication that this ramshackle hut could contain anything more than dust, dried out hay, a few rodents and a spattering of petrified cow chips. Or a '57 Porsche Speedster. And yet, incredible as it may seem, there -- smack on the property of one Flavio Saggitori -- there it was, as plain as day: one of only three experimental models ever built of the car that Augustus Porsche called his personal favorite.

Car Number One, of course, belonged to Porsche himself. Number Two, a gift by Porsche to a boyhood friend from Munich, Heinrich Mueller.

And Number Three? To the everlasting dismay of the master himself, Speedster Number Three was stolen during the infamous Tetrazini Auto Show Scandal of 1957. While it never surfaced again the buyer was always believed to be the reclusive Henry Benzini, who is said to have purchased it with the fortune he amassed over the years in trading foreign hubcaps of vintage automobiles. He was last seen in

(See PORSCHE, Page 2)

*Events Calendar*

2/12: Oshkosh Motor Show '90. Wauwatosa High School football field.

3/9: Sportscar Day. Music by Mothers of Speed.

3/11: Swap Meet. Mixer and Social.

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(See DESIGN, Page 3)

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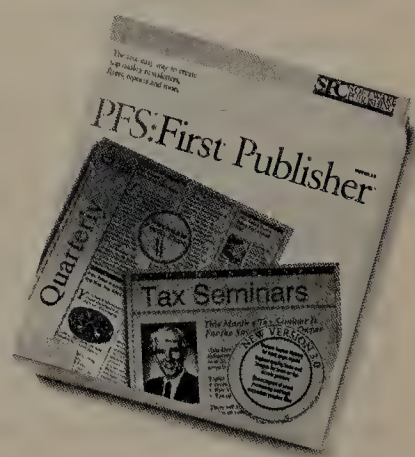


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**Circle 246 on reader service card**

**UNIX advocates: Bernie Johnson (left) supports 60 Xenix users at the Las Vegas Sun, while Harris's John Dewey chose Open Desktop for a programming team.**

# UNIX on the Desktop?

## *Target Is Would-Be OS/2 Users*

After conquering the academic, government, small multiuser, and technical workstation markets, this year UNIX is trying to elbow aside OS/2 as the next-generation operating system.

As Microsoft and IBM struggle to finish a polished version of OS/2 for the 80386 chip, UNIX offers a ready-made alternative. AT&T's veteran system software offers multitasking and multiuser operation, and for years it has fully supported the 80386 plus an extremely broad range of other CPUs. UNIX also has responded well to face-lifts—in the form of friendly, powerful user environments from Sun, the Open Software Foundation, and even Steve Jobs's Next (see "Tough Times for Next"). In short, say UNIX proponents, it boasts many of OS/2's most promising features, and it does so today.

One vocal UNIX evangelist is The Santa Cruz Operation (SCO) of Santa Cruz, California, which makes a healthy profit selling Xenix (the Microsoft-developed version of UNIX for PCs) as the basis of multiuser systems for small companies and professional offices. At one SCO Xenix installation, the *Las Vegas Sun*, some 60 employees work at terminals hooked into several Compaq Deskpro 386s. The system handles virtually all the newspaper's accounting needs and supports its circulation and advertising departments, says administrator Bernie Johnson. The *Sun* installed its system over three years ago after evaluating minicomputer and PC network alternatives. "It was the most cost-effective and the most flexible," says Johnson.

SCO estimates that it sells 100,000 such systems each year. Cofounder and vice president Doug Michels expects the multiuser market to grow, but he also sees opportunities in desktop PCs. SCO moved into that market in January with Open Desktop, a version of SCO UNIX that features Open Software Foundation's Motif environment and built-in data base and communications managers. Michels divides potential Open Desktop adopters into two categories: those who have standardized on UNIX and are looking for the most appropriate hardware platform, and those committed to PC hardware who are choosing between OS/2 and UNIX to connect all their systems.

The Harris Corporation of Melbourne, Florida, settled on Open Desktop's network server upgrade for its new Compaq Systempro. Twenty in-house programmers are running Open Desktop on their Compaq Deskpro 386/20s for both development and general business applications. "We didn't consider OS/2," says John Dewey, manager of systems integration services for Harris's information management group. "We are extremely committed to open standards, and OS/2 doesn't fit that environment. And with the Open Desktop's DOS merge function you can run multiple DOS sessions better than you can in OS/2."

But most users want to see plenty of applications from PC software vendors. Although several firms (including Ashton-Tate and Lotus) have committed to UNIX, "Open Desktop still has a real challenge to get vendors to write for the environment," says Judith Hurwitz, an analyst with Patricia Seybold's Office Computing Group in Bos-

*(see UNIX, p. 70)*

## Big Business Turns to OS/2

This is the year OS/2 breaks away from UNIX as the dominant high-end desktop operating system, according to a Computer Intelligence survey of 1500 U.S. organizations with 500 or more employees. Figures show planned usage.

DAVID LEE WAITE (LEFT), STEVE SAXTON (RIGHT)

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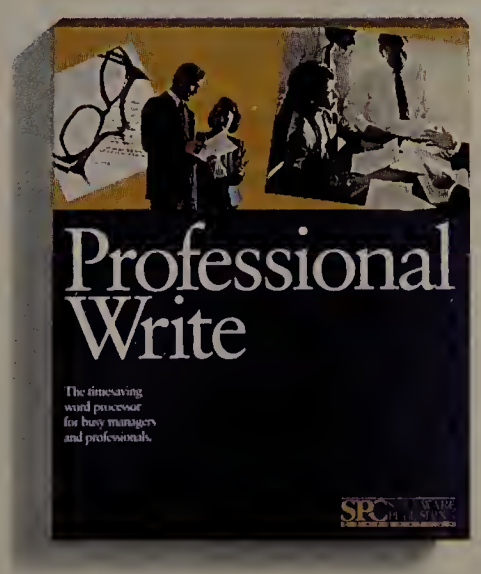


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## UNIX

*(continued from p. 68)*

ton. The ongoing dispute between Sun and the Open Software Foundation, in which each is pushing its own environment, "holds people back; it makes UNIX look like an unstable environment," Hurwitz says.

"UNIX and OS/2 are each best for different markets," maintains Mike Swavely, president of Compaq North America. Although Compaq is a strong supporter of UNIX, Swavely says "its place is in the multiuser arena, not on the desktop. Companies that believe UNIX can substitute for OS/2 on the desktop as a single-user [operating system] will be very disappointed." Swavely and Hurwitz agree that PC software companies that develop personal productivity applications have given OS/2 greater priority.

"The only place where the market is the same is in the networking arena," Swavely says. Here is the so-called minicomputer replacement market being touted by Compaq and other high-end PC manufacturers. When Compaq introduced the SystemPro last year, the new server debuted not just with LAN Manager and NetWare but with a multiprocessor version of SCO UNIX. With the SystemPro, says Michels, "you can think about 100-user systems—markets that we couldn't penetrate with the older product line." —*Roberta Furger*

# Tough Times for Next

## *IBM Endorses NextStep—Sort Of*

**The Next Machine earns raves from developers, but customers aren't buying Steve Jobs's elegant desktop.**

BOB HOLMGREN

Lights! Camera! Steve Jobs!

Apple's colorful founder has gotten plenty of publicity for his Next start-up and its elegant Next Machine. Jobs also has gathered financial backing from entrepreneur H. Ross Perot and Canon, Inc., a blessing of sorts from IBM, and a distribution agreement with Businessland once expected to total $100 million.

Only problem: Next machines are barely moving. "They are gaining some acceptance in the academic market, but sales through Businessland have been very slow," says Peter Teige, senior analyst with InfoCorp in San Jose, California. InfoCorp estimates that Next shipped 5000 machines from July through December, 1989, and volume hasn't climbed much this year.

Built around the Motorola 68030 CPU (which also powers the latest Macintoshes), the Next machine has a very high resolution monochrome screen, a digital signal processor for audio and other tasks, removable erasable-optical drives, and other impressive features. It comes with NextStep, a dazzling object-oriented software environment, and has a $9995 list price that compares well with its rivals'.

"But the Next machine's potential is extremely muted by a lack of software," comments Paul Zagaeski, senior analyst with the Yankee Group in Boston. While Ashton-Tate, Lotus, WordPerfect, and others are working on NextStep packages, Teige questions the level of commitment: "I don't know why anybody would write commercial applications for a platform that has no installed base." Jobs broke out of that catch-22 situation with the Macintosh. But the Mac was unique in ways the Next Machine—which must compete with rival desktops tackling similar problems in similar fashion—is not.

IBM has endorsed NextStep and will offer it on the new POWER workstations and on PS/2s under AIX, but analysts caution that Next should not expect too much from this deal. "IBM is just offering it as an optional interface," notes Amy Wohl of Wohl Associates in Bala Cynwyd, Pennsylvania.

Another IBM partner whose business edge also lay in software rather than hardware—Metaphor Computer—recently pulled out of hardware altogether. No one expects Next to do that, because Jobs is going for broke again—building his own highly automated factory and hiring plenty of employees. As one software executive puts it, "Next will be either a 50-story building or a hole in the ground."

Zagaeski thinks it will be difficult for Next to go public soon or raise more venture capital ("I doubt there are a lot of angels out there asking, What hole are you going to throw the money down this year, Steve?"). But Next's pockets should be deep enough to produce a next-generation machine and await a round of packages this fall. "I don't think you should count Steve Jobs out," Zagaeski says. —*E. B.* ●

# TWO-FISTED MANAGEMENT

AH, THE HEADY DAYS OF HIGH-STAKES MERGERS AND BLOODY BUYOUTS ARE FAST FADING. GATHER 'ROUND AS I RECALL ONE PARTICULARLY ROUSING CAMPAIGN...

BUD LITE '89

MARK M, 33 ©1990

# THE SIXIN-DAY BIDDING WAR OF '88

WARNING: SOME OF THE FOLLOWING FOOTAGE CONTAINS SCENES OF GRAPHIC DIVESTITURE. READER DISCRETION ADVISED.

WE JOIN THE CONFLICT IN ITS 3rd DAY OF HEATED EXCHANGE.

Ya want 100 million? Yeh?! You'll hafta come and get it!!

ZING

POW

RAT-TAT

Cover me, Harry!

CLIK SNAP

(PUFF, PUFF) Ms. Verner, get ahold of our accountant. Tell him we need another 20 mill'.

He says we've used up all our resources; we're on our own.

Frankly, I'm scared!

POP POP

DAY 6: This waiting, this endless waiting! I tell you, Harris, I'm gonna crack!!

Wait! what's that? It's a counterbid!

300 MILLION OVER 6 YEARS

No, McAllen! Stay down. They're just trying to draw us out!

0800, DAY 7, IN THE NICK OF TIME:

HERE COMES THE CAVALRY!

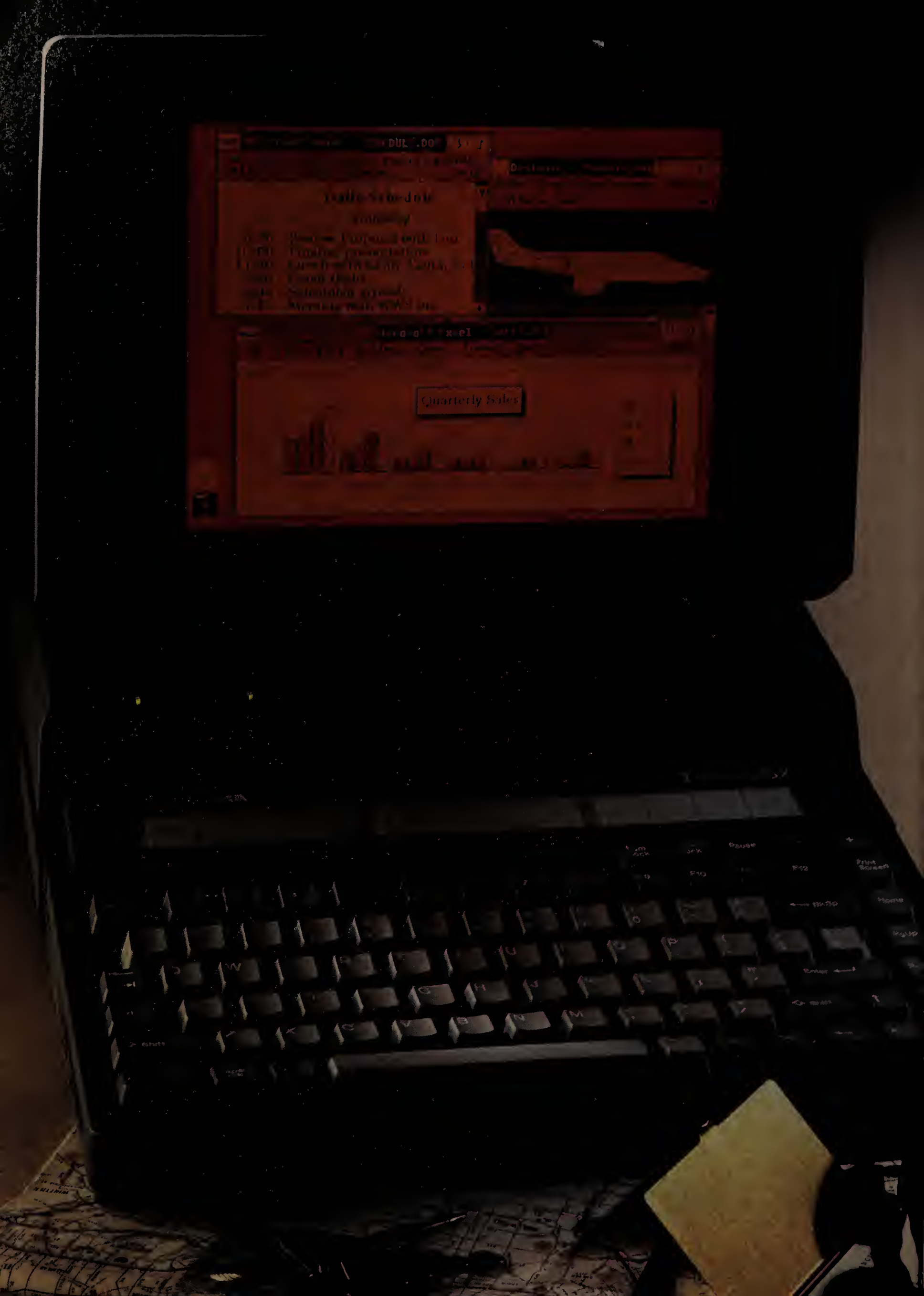
RUMBLE

IT'S THE OLDEST WAR TRICK IN THE BOOK: DRESS UP A BUNCH OF INTERNS AS SEC INVESTIGATORS, AND THE "OUTNUMBERED" ENEMY THROWS IN THE TOWEL.

Good work, guys. Now, get back to the mailroom

Over there-- and no funny stuff!

MARK MAREK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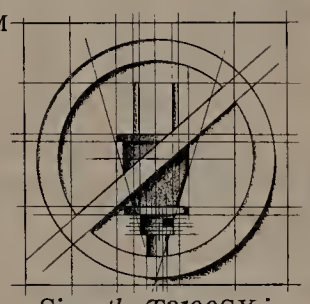
# We've pulled the plug on 386SX technology.

The top of a desk is no longer the only place 386™-based computing gets done. That's because we've come up with a battery-powered alternative that works anywhere. It's known simply as the T3100SX.



*Since the T3100SX is battery operated, you can utilize powerful 386 applications anywhere you choose.*

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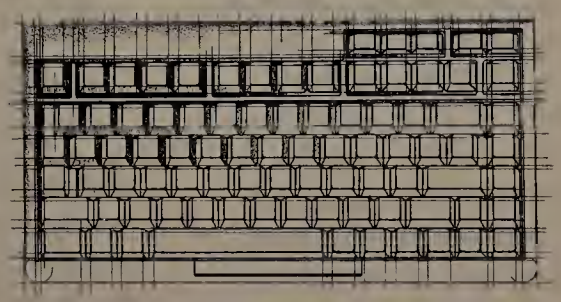
*The T3100SX's slim case is only 3.15 inches thick and weighs just 14.9 pounds including its two standard batteries.*

Finally, we gave it a 40MB hard disk, a 1.44MB 3.5″ floppy disk drive and 1 megabyte of RAM, which you can expand up to 13MB. All in an easy-to-carry, 14.9-pound package that goes wherever your work is.



*The ergonomically-designed 86-key keyboard features eight dedicated cursor control keys, 12 function keys and a numeric keypad.*

So now you can put the latest 386 computing power to work for you, even if there isn't a plug anywhere in sight. The Toshiba T3100SX. Take it. See how far you can go.

*T3100SX: 14.9 pounds, 16MHz 386SX with 80387SX math coprocessor socket; 40MB hard disk with 25msec access, two removable, rechargeable batteries; three dedicated Toshiba memory slots, one dedicated Toshiba modem slot, one Toshiba general purpose slot; 1MB RAM expandable to 13MB, gas plasma VGA display with 16 gray scales and 100:1 contrast ratio; 1.44MB 3½″ diskette drive. 386 is a trademark of Intel Corporation.*

*For more information call 1-800-457-7777.*

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# Wingz Soars Into the OS/2 Picture

**Informix brings flashy graphics and powerful object-oriented tools to OS/2**

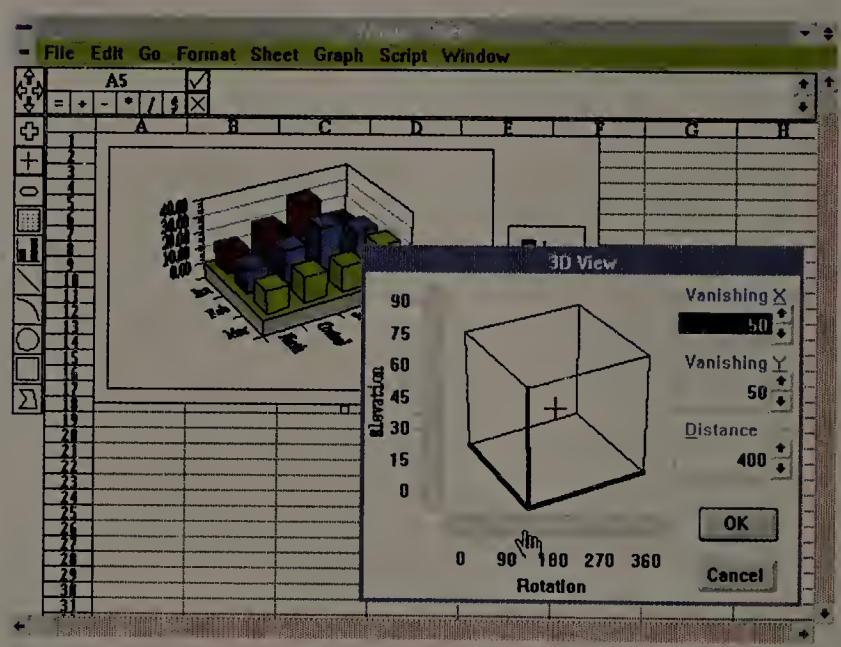
**—but it doesn't quite match its rivals' spreadsheet facilities.**

*Evelyn Morrison*

A dark horse has entered the OS/2 spreadsheet race. Informix Software is readying its *Wingz for OS/2 Presentation Manager* and could set up a rousing three-way rivalry with *Excel for OS/2* and *1-2-3/G*. Informix promises a *Windows 3.0* stablemate as well.

In the past year, *Wingz* has emerged as a favorite among Macintosh users, and the PM version retains its most desirable characteristics: stellar graphics and a powerful object-oriented scripting language. In fact, the PM incarnation is practically identical in terms of interface, commands, and functions. It also shares many features with *Excel*—an added inducement for *Excel* users to switch.

**PC World previews are informal assessments of products that at press time were still in the development stage. Complete reviews—including features evaluations and performance testing—will appear only after a product is officially released.**




**Wingz' spectacular 3-D graphics capability includes bar, line, contour, surface, and wireframe charts. You can rotate a graph in 3-D space to get the optimal presentation perspective so crucial data isn't hidden.**

## A Well-Stocked Toolbox

*Wingz* distinguishes itself with its knack for incorporating user-defined objects into a spreadsheet environment. The list of objects includes charts, text fields, graphics images, and buttons (which can initiate a script). Objects can be placed anywhere in the worksheet and grouped to form a new object. You build objects via tools in a toolbox that's always present on the left side of the screen.

The button tool is ideal for developing user-friendly applications, since you can execute a set of commands contained in a *Wingz* script simply by clicking on the button.

The text tool provides simple word processing capabilities and even lets you create custom help windows, complete with scroll bars; you have full control over margins, line spacing, fonts, and type sizes. (Like all *Wingz* objects, the text windows can be moved and resized.) Unlike *1-2-3/G*, however, *Wingz* doesn't let you preview type in various fonts and sizes.

But *Wingz'* most compelling component is its unsurpassed graphics. The package boasts nearly two dozen graph types, including three-dimensional bar and line charts, mixed charts, and dual *y*-axis graphs. For scientific applications, you can display impressive surface, contour, and wireframe charts.

Creating a graph couldn't be simpler. Highlight the data you want to graph, click on the graph tool, and use the mouse to create whatever size window you need. The chart

**SNAPSHOT**

## Wingz for OS/2 Presentation Manager

A high-end spreadsheet ported over from the Macintosh gives OS/2 users snazzy graphics and powerful tools.

**KEY FEATURES**

- **Superior graphics**
- **Powerful scripting language**
- **Multiple-worksheet capability**
- **Flexible text handling**
- **Auditing commands**

**AVAILABILITY**
Expected by July

**PRICING**
Unavailable at press time

**Informix Software, Inc.**
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913/599-7100

**Reader service no. 655**

appears almost instantly and is hot-linked to your data. The graph settings are easy to change, and you control most aspects of the graphs (through menus). You can even reorient an image in three-dimensional space to prevent key data from being hidden, a common problem.

Additionally, you can dress up your work with graphics files (either OS/2 Metafile files or bit-mapped graphics via the PM clipboard) from other applications.

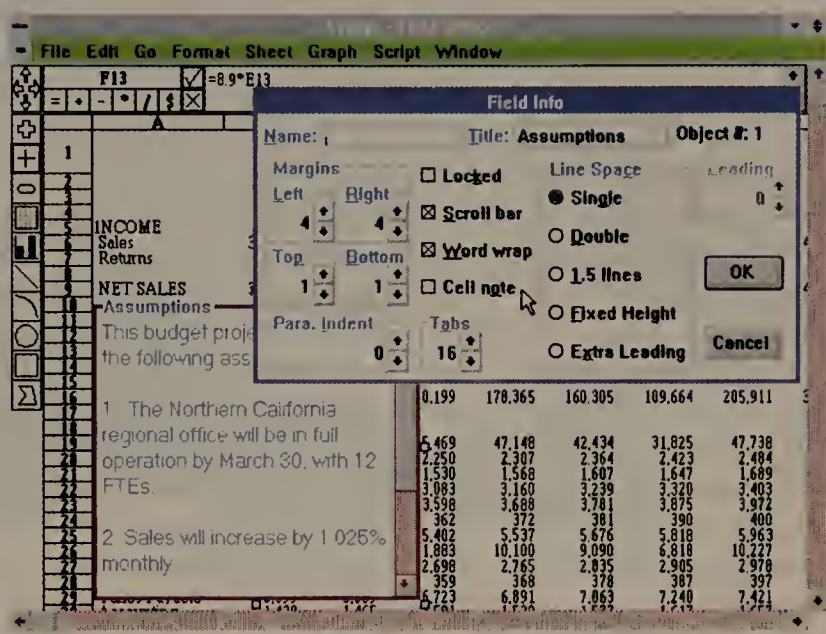
### The Windowed Worksheet

Naturally, *Wingz* includes most of the features that define high-end spreadsheets: minimal recalculation, support for different files in separate windows, and the ability to mix and match fonts and type sizes. Its display is strictly WYSIWYG and includes a page previewer, but it lacks *Excel*'s handy magnifying glass icon to zoom in on part of a page.

If your style demands multipage worksheets à la *1-2-3/G*, *Wingz* will be a disappointment. You can reference cells in other worksheets and even use those links in formulas, but you can't access data on disk since all supporting worksheets must be opened before the links are activated. Also lacking is the foolproof point-and-click cell-linking process available with both *Excel* and *1-2-3/G*. These limitations, Informix says, will be remedied in a future version.

Analytical types will be impressed with the number and variety of built-in functions. Besides the inventory of about 150 spreadsheet functions, an additional 175 functions are available in the scripting language. If you still aren't satisfied, you can develop your own.

The product can communicate with other applications through the Clipboard and supports Dynamic Data Exchange (DDE) links (which must be tailored on each end). *Wingz* has its own file format, but it can read and




**You have good control over text objects (shown here with a red border), including margins and line spacing. You can even add a scroll bar if needed.**

write *1-2-3* WKS and WK1 files as well as DIF, SYLK, and ASCII formats. Although the prerelease version could not handle *Excel* files, the commercial release should be able to.

### Writing Scripts

Like HyperCard's HyperTalk, the *Wingz* scripting language is meant for programming tasks that run the gamut from simple keystroke playback to sophisticated menu-driven applications. A script editor is supplied, and the scripts are compiled for improved speed. During compilation, errors are highlighted, and you're returned to the appropriate spot to make your corrections. You can also readily create simple macros with the product's learn mode.

The Fill feature is particularly handy, since it works not only with numbers but with certain words that convey serial information. For example, if the first cell of a 12-item range contains 'January', the *Wingz* Fill command will insert the remaining months with only a few mouse clicks.

*Wingz* definitely outstrips the competition in auditing. You can quickly select all cells of a particular type—for example, text, formulas, or blanks. In addition, you can highlight all cells that depend on a particular cell (or all cells on which a target cell depends). In either case, you have your choice of all or only direct precedents or dependents. You can also highlight all cells that are not referenced or formulas that reference blank cells—both likely candidates for errors.

Other error-handling features include an autosave command that will store your work at any desired interval, and a single-step undo that will reverse the effects of many commands. On-line help is available and can remain on screen while you work.

*Wingz* also has data base capability, but it's for strictly run-of-the-mill queries of record- and field-oriented data. Both *1-2-3/G* and *Excel* (with *Q+E*), with their external data base access, seem preferable for those who like to use their spreadsheet for data base chores.

**Waiting for Polish**

Like *1-2-3/G*, *Wingz* sports cascading menus: Submenus appear automatically as you drag the highlight bar down the vertical menu. (In some places, however, a dialog box would be a more efficient method of making selections.) The mouse interface also features a four-way directional icon that moves the cell cursor to the end of the current cell block.

You can use the mouse to point to a cell or range when building a formula, and a set of operator icons including +, *, and $ (for making a reference absolute) is also available. In addition, you can pick @ functions and dummy arguments from a pulldown list.

The beta release lacked a keyboard interface in several areas, requiring the use of a mouse—apparently to maintain full compatibility with the Mac version. By the time *Wingz* hits the streets, it may well be more accommodating for those who prefer to use keystrokes.

This product lacks a few niceties that *Excel* and *1-2-3/G* users take for granted. For example, row height does not adjust automatically to accommodate larger type sizes. And if you use file linking, you'll certainly miss the equivalent of a command to open all supporting worksheets.

By and large, however, *Wingz* is ready for the race. As OS/2 becomes more prevalent, the most pressing problem facing spreadsheet users will be choosing among the three top-notch contenders. *Excel* offers a smooth upgrade from the leading *Windows* spreadsheet. *1-2-3/G* may pack the most analytical power—especially with its Solver goal-seeking utility. *Wingz*, with limited file linking and lack of multipage capabilities, carries a slight handicap in handling worksheets but will probably emerge as the clear leader in graphics and presentations. ●

*Evelyn Morrison frequently writes about spreadsheets for* PC World.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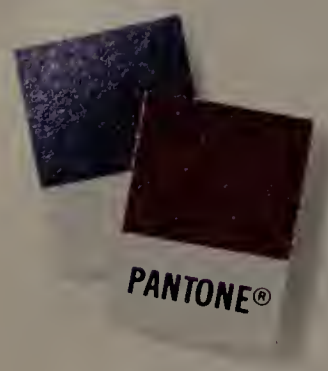


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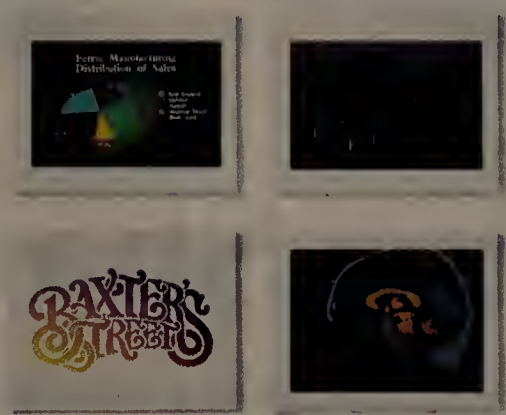


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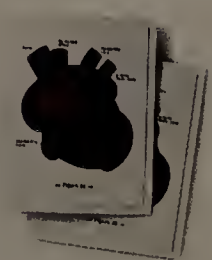
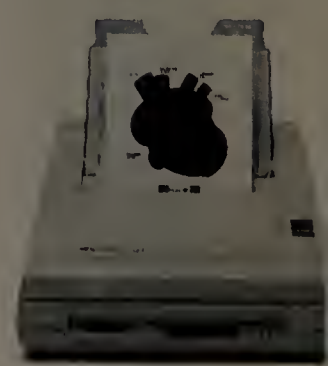


*The old way: Days and weeks.*

*The new way: Minutes and ours.*



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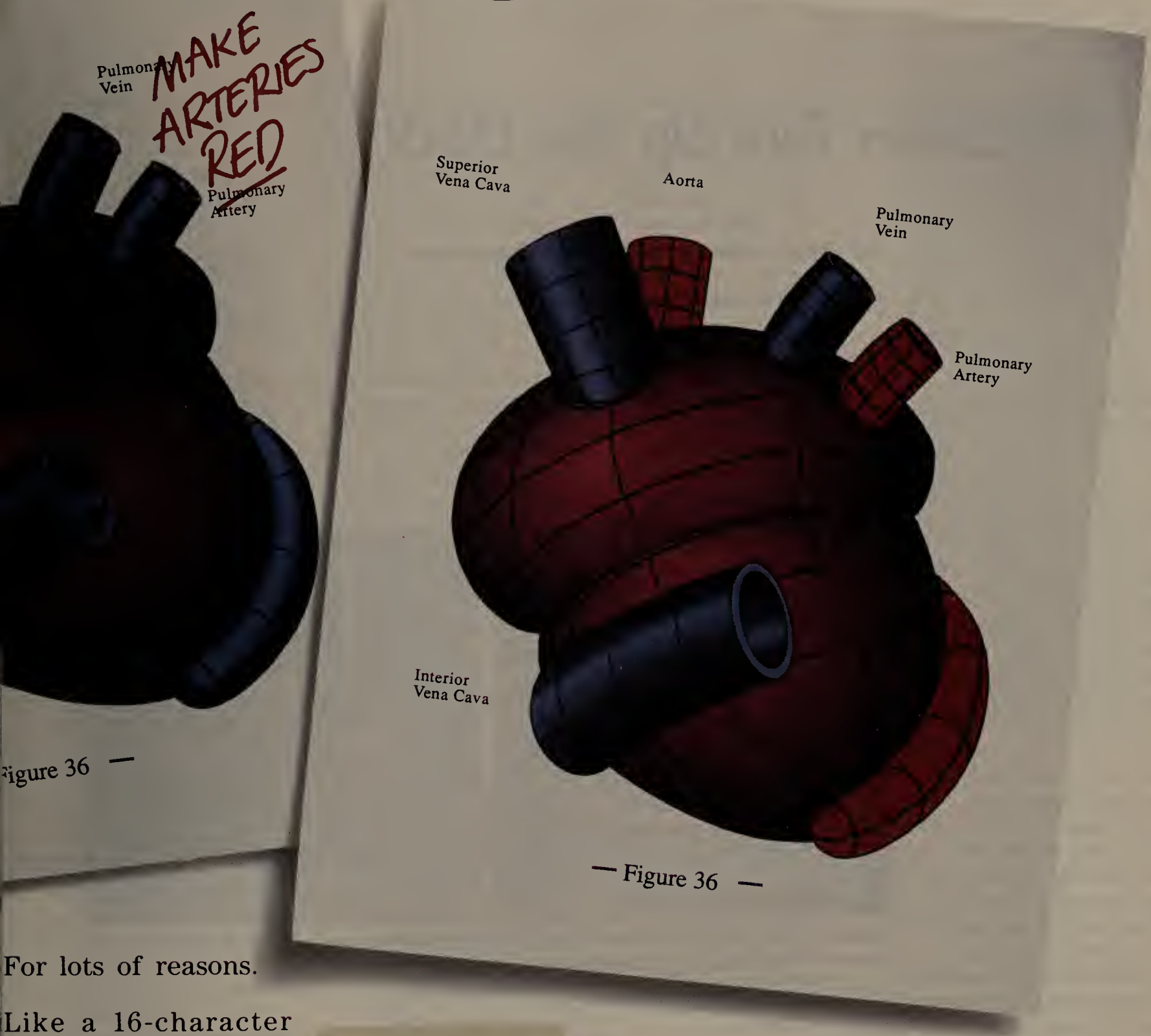


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# SX Machines Turn Up the Clock

**Dell and NCR debut the first desktops built around the new 20-MHz SX chip.**

*Lincoln Spector*

Intel's 80386SX processor lets computer manufacturers build inexpensive PCs that run all 386 software; the only drawbacks are a slight cost in speed and a 16MB limit on addressable memory. Low pricing on these systems has made them popular in entry-level business roles, and sales have skyrocketed in recent months. One result of the new machines' success has been the death of the original 16-MHz 386. Now, with Intel's recent release of a 20-MHz SX chip, the 20-MHz 386 clearly is destined for the same fate.

Dell and NCR were quick to get the 20-MHz SX bandwagon rolling. Dell's entry is a full-sized box that affords plenty of expandability for anyone willing to sacrifice desk space. NCR has kept its system small and concentrated on packing it with features.

**20-MHz systems like NCR's PC386sx (left) and Dell's 320LX offer speed close to that of a standard 20-MHz 386, but at a significantly lower price.**

### Dell's Expansion Plans

Dell's 320LX comes in a full-sized case with six 8/16-bit ISA slots, two 8-bit slots, and five disk bays—three of them front accessible for floppies and tape drives. With a parallel port, two serial ports, a hard disk connector, and a floppy controller built into the motherboard, only one slot—for a video card—must be set aside to run the system. It's doubtful that most users need this much expandability; neither is the 320LX a likely choice as a file server or CAD workstation. The larger size has allowed Dell to hit the market sooner, but if you don't need the extra slots or drive bays, you're giving up desk space for nothing.

The motherboard has two sets of four SIMM memory sockets; each set accepts either all 256K or all 1MB modules. The 320LX can address a total of 16MB, but for more than 8MB you'll need a standard memory card in a 16-bit slot, which degrades performance.

With a 40MB hard disk, VGA, and 1MB of RAM, the 320LX costs $3199—only $300 more than Dell's similarly equipped 16-MHz SX offering. In order to keep the price down, Dell dispensed with memory caching. The RAM is in-

terleaved, which speeds things up somewhat, but not as much as a cache would. According to Dell, the system is about as fast as an uncached 20-MHz 386. (Almost half of the 20-MHz 386 models now available in the market are outfitted with a cache.)

The 320LX's construction is sturdy, with none of the badly fitting parts or sharp edges found in some cheap clones. The motherboard is essentially the same as that of Dell's full-sized 16-MHz SX; only the CPU and oscillator have been changed. A socket for a 20-MHz 80387SX coprocessor is provided, but that chip wasn't available at press time.

Although it certainly could serve as a business workstation, the 320LX is packaged for individuals, including novices. It comes with its hard disk formatted and the operating system (your choice of DOS 3.3 or 4.01, OS/2, or UNIX) already installed. The exceptionally well-designed documentation uses abundant graphics to explain everything from installing a hard disk to using directories.

### NCR Thinks Small

NCR's 20-MHz PC386sx is a compact, elegant PC designed for corporate life. Four of its five 8/16-bit ISA slots are mounted horizontally, parallel to the motherboard. The drive bays are in a long, narrow cage that lifts out easily without need of a screwdriver, giving easy access to the drives themselves and the motherboard beneath. Although both 5¼- and 3½-inch floppy drives are supported, the narrow hard disk bay fits only a 3½-inch drive. A built-in external port plug makes it easy to add an external floppy drive or tape backup.

As with the Dell, the motherboard contains a 20-MHz 80387SX socket, and controllers for a hard disk and two floppy drives—with the floppy controller also supporting tape backup drives. The NCR has one parallel and two serial ports, and the setup program allows you to configure their assignments. The back of the computer sports a volume control and the external floppy port. The keyboard interface is compatible with PS/2s rather than ATs, so if you buy a third-party keyboard, you may have to pay extra for an adapter. Security-minded users will breathe easier with four levels of ROM-based password protection and the ability to prohibit booting from a floppy.

The PC386sx has four sets of two SIMM sockets each on the motherboard. In addition to 256K and 1MB modules, the sockets accept 4MB SIMMs. Like all SX systems, NCR's PC386sx is limited to 16MB of memory. The NCR also comes with 16-bit, 256K VGA Plus on the motherboard, upgradable to 512K. Capable of generating up to 1024 by 768 resolution if memory is added, the PC386sx's video interface includes the standard VGA auxiliary video connector.

The PC386sx comes with a 16K cache, controlled by the Intel 82385SX-20 chip. NCR claims that the PC386sx offers performance comparable to that of a full-fledged, cached 20-MHz 386.

All these extra features add to the cost. With a 40MB hard disk, 2MB of RAM, and VGA, a PC386sx lists for $4695—nearly half again as much as its Dell rival. This price difference may not be as severe as it sounds, however, because the NCR offering will sell on the street for much less, while the Dell list price is for real. In comparison, NCR's 16-MHz SX machine goes for $3795.

Promising significant savings over its full 32-bit cousins with little speed penalty in most applications, the 20-MHz SX looks toward a bright future. We should expect many vendors to follow suit, offering a good price/performance ratio at the low end of the 386 market. ●

*Lincoln Spector is a* PC World *assistant editor.*

**SNAPSHOT**

**System 320LX**

Dell's full-sized, inexpensive system will appeal to 80386SX customers willing to pay a little extra for a bit more speed.

**KEY FEATURES**

- **Full expandability**
- **Excellent documentation**

**AVAILABILITY**

April

**PRICING**

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**SNAPSHOT**

**20-MHz PC386sx**

NCR claims that this slim, business-oriented system packs speed equivalent to that of a full-fledged 20-MHz 386.

**KEY FEATURES**

- **Password-protected hardware**
- **16K memory cache**

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- 4 Megs RAM
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## 33 MHZ 386 VGA

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- 64K Cache RAM
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- 1.44 Meg 3.5" Drive
- 150 Meg ESDI Drive
- ESDI Controller with 32K Cache
- 16 Bit VGA with 512K
- 14" 1024 x 768 Color Monitor
- 1 Parallel & 2 Serial Ports
- 101 Key Keyboard
- MS DOS 3.3 or 4.01

**$3995.00**

## 25 MHZ 486 VGA

- 4 Megs RAM
- 1.2 Meg 5¼" Drive
- 1.44 Meg 3.5" Drive
- 150 Meg ESDI Drive
- ESDI Controller with 32K Cache
- 16 Bit VGA with 512K
- 14" 1024 x 768 Color Monitor
- 1 Parallel & 2 Serial Ports
- 101 Key Keyboard
- MS DOS 3.3 or 4.01

**$5295.00**

*This device has not been approved by the Federal Communications Commission. This device is not, and may not be offered for sale or lease, or sold or leased until the approval of the FCC has been obtained.*

*Due to the volatility of the DRAM market, all prices subject to change*

# Pull Up A Chair And We'll Tell You Why

*Ted:* OK, we're putting together another ad for the magazines and I thought you should be the ones to write it.

*Todd (laughing):* Hey, Ted, I'm no writer.

*Ray:* Me neither. Don't you s'pose we could hire somebody to write our ads? (Laughter.)

*Ted:* No, because we've always been straight forward in our advertising. I've analyzed the market and I can't understand why anyone would buy a computer from anyplace except Gateway. Now I know you all agree with me, so I want you to tell the world what you can do for them. Just straight talk from a friend in the business. I'm recording this—

*Troy:* Is this legal?

*Ted:* —and I'm gonna give the tape to word processing for a transcription. And that's gonna be our ad.

*Norm:* This oughta be good! (Laughter.)

*Ted:* Todd, you're on. I'm looking for a computer system. Why should I buy from Gateway 2000?

*Todd:* Because Gateway has the best value. We lead the market in price, quality and service. It's that simple. You wanta get the best system for the best price from a company you can depend on? Then buy from Gateway 2000.

*Troy:* Yeah, shop around. But don't be fooled by stripped-down systems. Compare Gateway feature for feature and we blow the competition away.

*Norm:* And read the reviews. Our systems out-perform machines that cost twice as much.

*Ted:* Troy, you're on. You run the plant so you tell me what kind of quality I can expect?

*Troy:* Well we use a component that's not very common today—pride. Each machine that goes out the door is custom-built by one person. That person's pay is determined by how satisfied you are as a customer. We use only top-of-the-line components. You combine that with the midwest work ethic and you've got an unbeatable combination.

*Ted:* OK, Gateway's got great prices on quality systems. But we can't guarantee everyone that they'll never have a problem.

*Ray:* If we could, I'd be out of a job. (Laughter.)

*Ted:* Yeah, Ray. Tell me about your job. What happens if a customer does have a problem?

*Ray:* That's where we shine. Gateway's tech support is the best in the industry. We know what we're talkin' about, but most importantly, we care. We'll bend over backwards to take care of you. You won't hear us saying, "Sorry ma'am, that's a software problem." We don't care whose problem it is. If the machine is not working for you, we'll do everything in our power to get you up and running.

*Ted:* What if you can't fix a problem over the phone?

*Ray:* Then we can send a technician to almost anyplace in the nation.

*Ted:* Kathy—bet you thought I forgot you—what about customer service?

*Kathy:* Customers get very personal service here. When you call Gateway, you'll be assigned to one customer service representative who will follow your order from start to finish. Your personal rep will make a special effort to get to know you and make sure you're completely satisfied.

*Norm:* Hey, this sounds almost too good to be true.

*Ted:* Some people think that. But our customers don't—ask them. They know Gateway 2000 is the best value in the industry.

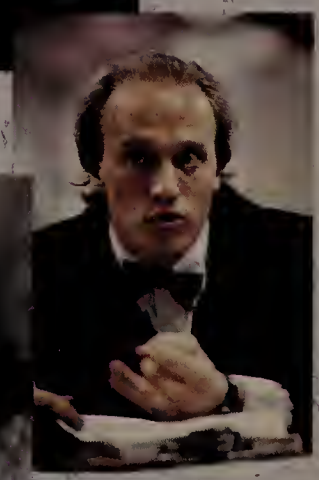
*Norm:* Do we have an ad yet?

*Ted:* Yeah, I think so. All I have to do is cut some prices on our systems. Then get ready for a really hot summer... (Tape End Indicator.)

*Ted Waitt, President*

*Troy Miller, Plant Manager*

*Norm Waitt, Vice President*



*Todd Osborn, Sales Manager*

*Kathy Skidmore, Customer Service Manager*

*Ray Kayl, Technical Support Manager*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# PRODUCT OUTLOOK

## INSIDE PRODUCT OUTLOOK


85 **T1000SE, T1000XE, T1200XE**
Toshiba takes on Compaq's LTEs: Its three new notebooks are small, light, and priced to sell.

85 **Acer 1200, AST Premium 486/25E EISA**
If you need PC power on a grand scale, check out these 486 behemoths with EISA expandability.

86 **Kyocera Q-8010**
A PostScript printer with something for everyone—speed, reliability, and LaserJet II emulation.

88 **MicroMaster 386/33**
Put some spark into your low-end PS/2 with one of Aox's 80386 bus-master upgrade boards.

88 **Tandon 486/25**
This 486-based EISA system offers some impressive extras to handle power-hungry software.

90 **Enable/BP**
The versatile integrated package offers an easy upgrade path and a smart start for small business.

90 **Faxit for Windows**
Alien Computing provides a way to convert your *Windows* documents into sharp-looking fax output.

92 **Regal SX**
This 386SX laptop combines a low price with a full array of features—and a money-back guarantee.

92 **MicroLaser PS35**
Texas Instruments' desktop laser gives you true Adobe PostScript—for half the price you'd expect.

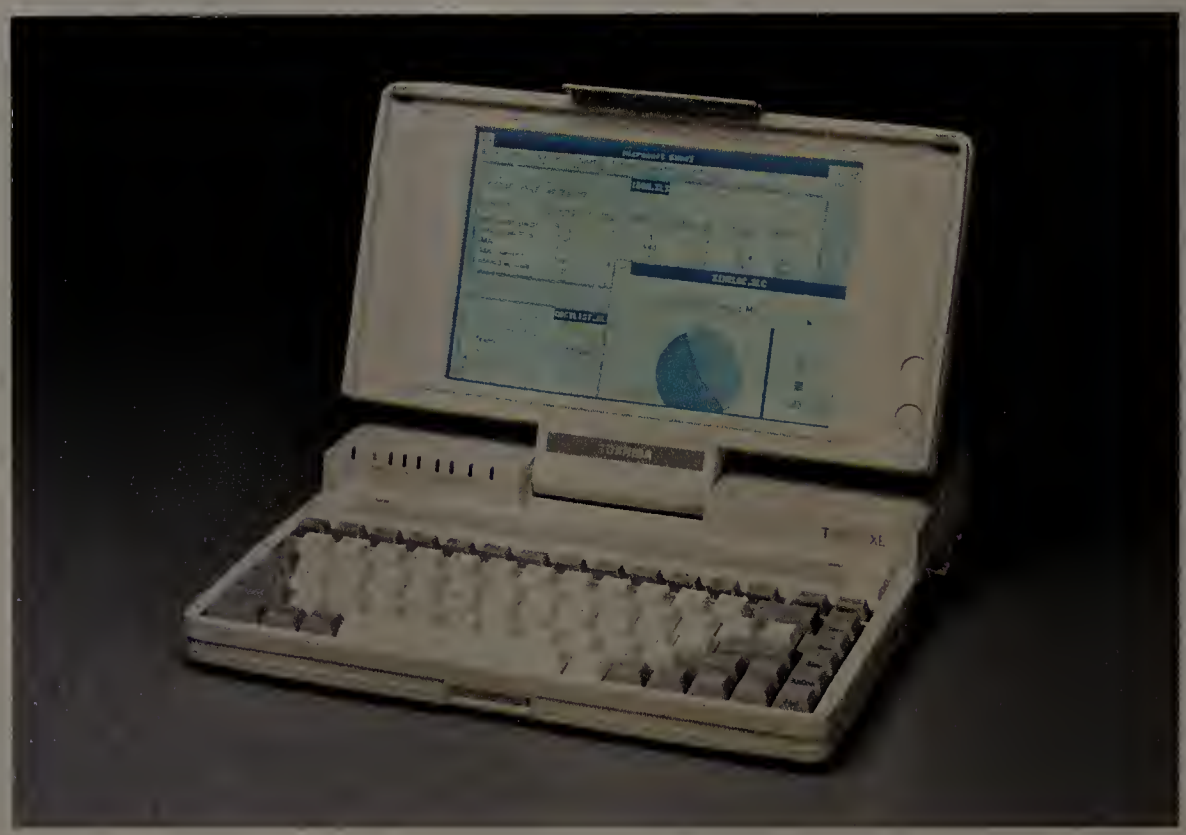

## UPDATE


94 **PFS: First Publisher 3.0**
Fast font creation and better-looking output add to the appeal of this desktop publishing standby.

94 **Clarion Professional Developer 2.1, Clarion Report Writer**
Build data base applications and generate reports with easier-to-use developers' tools.

96 **DOS Partner 1.1**
Using EasySoft's DOS shell and menu system, you can manage a hard disk without DOS commands.

96 **PowerBASIC 2.0**
*Turbo Basic* gets a new name, a debugger, faster math routines, and unlimited space for strings.

**Like its cousins the T1000SE and T1000XE, Toshiba's 80C286-based T1200XE system features exceptional screen quality, a good keyboard, and more memory than most notebooks.**

T1000SE, T1000XE, T1200XE

## Notable Notebooks Spotlight Ergonomics, Screen

The Toshiba T1000SE, T1000XE, and T1200XE aren't the last word in notebook technology. But they offer an appealing combination of small footprint, light weight, and aggressive pricing as well as an emphasis on good ergonomics and screen quality.

The T1000 series, with its 9.54-MHz 80C86 CPU, is Toshiba's answer to the much-heralded Compaq LTE, while the 80C286-based T1200XE is a hard drive version of Toshiba's T1200 meant to go head-to-head with Compaq's LTE/286.

Both T1000 models weigh about 6 pounds, and they have the same footprint. The principal difference between the $1699 T1000SE and the $2699 T1000XE, aside from price, is that the T1000XE has a 25ms 20MB hard drive, while for the T1000SE you must rely on a standard 1.44MB 3½-inch floppy or an optional 5¼-inch external drive. Both have DOS 3.3 and the *Lap-Link* file transfer utility in ROM so that you can download to a desktop.

The T1000SE is for people who write a few memos and use simple spreadsheets; the T1000XE can handle more demanding applications. And if you need still more speed and memory, the 12-MHz T1200XE expands from the standard 1MB of RAM to 5MB and offers both a 3½-inch floppy and a 20MB hard drive. Although just 7.5 pounds, and only an inch deeper than the 12.4-by-10.6-by-2-inch T1000s, the $3999 T1200XE is meant to be a battery-powered desktop PC equivalent.

The rival Compaq machines are equipped with both 3½-inch floppy and hard drives, and the LTE/286 has a docking station that lets you do some serious expansion. But in addition to parallel and serial ports, all the Toshibas have a 100-pin connector that is the gateway to a future 16-bit expansion bus. For now, a 2400-bps modem sized to fit the Toshiba modem slot is the only option.

The T1000 Toshibas ship with 1MB of memory. By plugging in two 1MB cards, you can expand to 3MB—triple the capacity of the Compaq offerings. The cards lack batteries, so you can't use them for storage, but all the Toshiba machines have an auto-resume feature that will let you turn off the machine and save a RAM disk as-is for as long as seven days on fresh nickel-cadmium batteries.

The T1000SE and XE share the same 9-inch diagonal supertwist nematic LCD with double-scan CGA (640 by 400), while the T1200XE has a slightly larger and brighter version of the same—all sporting twice the vertical graphics resolution of the Compaq machines.

A well-sculpted 82-key keyboard has the feel of a desktop keyboard and eight cursor control keys—features unusual for portables in this class. The systems all use the same nickel-cadmium power source, rated at a respectable 2½ hours of charge. Toshiba America Information Systems Inc., 9740 Irvine Blvd., Irvine, CA 92718; 800/999-4273.
— *Mike Hogan*

**Reader service no. 660**

Acer 1200, AST Premium 486/25E EISA

## EISA Powerhouses Balance 486 Muscle, Expandability

**The Acer 1200 (left) and the AST Premium 486/25E EISA (right) combine the power of high-end coprocessors and Intel's i486 chip with the broad data path of the EISA bus for multiuser tasks.**

This kind of performance doesn't come cheap, but if you need a hot network file server, high-end workstation, or multiuser system, you may want to look at Extended Industry Standard Architecture (EISA) powerhouses from Acer and AST. Both machines use Intel's 25-MHz i486 chip, take advantage of 32-bit software, and support the Weitek 4167-25.

The Acer 1200 has the memory edge with a standard configuration of 4MB of RAM expandable to

*(see Acer, AST, p. 86)*

Kyocera Q-8010

## Do-It-All Printer Sidesteps the PostScript-LaserJet Debate

Desperately seeking a be-all printer for your network? The Kyocera Q-8010 could be just the answer for your work group. This $6995 PostScript machine not only prints at a fast 10 ppm but also offers solid LaserJet Series II emulation with three printer ports (serial, parallel, and AppleTalk) that can be preset, eliminating the hassle of switching emulations via software.

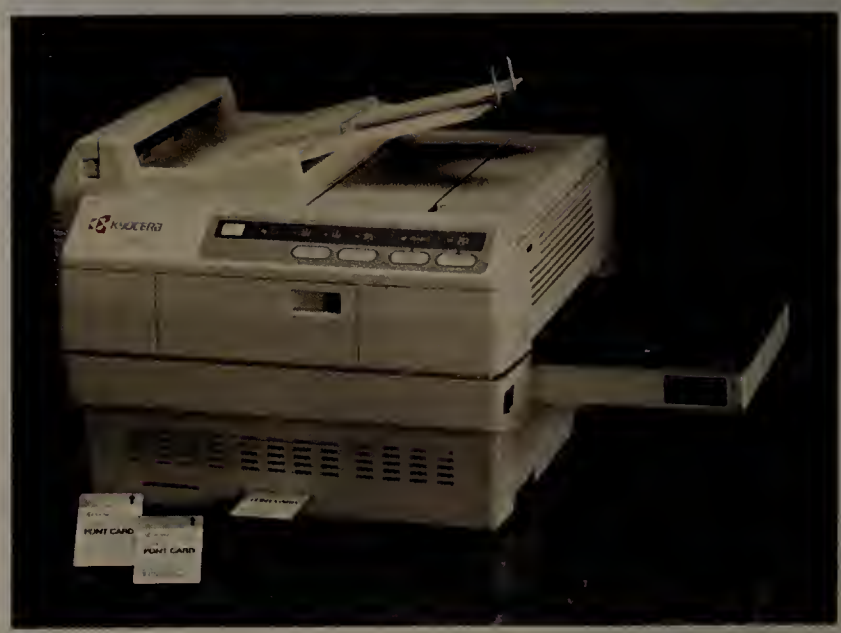
The Q-8010 is fast with graphics as well as with text, thanks to an on-board CPU, a math coprocessor, and judicious use of RAM. It comes with 5MB of RAM (expandable to 6MB), 4MB of which is dedicated to composing two pages at a time. The other megabyte or two can be devoted to downloading fonts.

Along with speed you get a 10,000-page monthly duty cycle (nearly twice that of the LaserWriter IINTX), 35 standard PostScript fonts, and the ability to use Type 3 (but not Type 1) downloadable fonts from Adobe. If 35 fonts aren't enough, Kyocera sells three font cards with 4 fonts each for $325 per card.

The Q-8010 printer not only emulates up to 16 different LaserJet cartridges, it lets you call on a variety of scalable fonts. The fonts include the equivalent of the LaserJet's standard internal set, Times Roman and Helvetica, and some headline fonts such as Century Schoolbook. To use scalable fonts in HP emulation mode, you must have a Q-8010–specific driver for your application; Kyocera claims that WordPerfect and others will have drivers soon.

The Q-8010 is limited to a single 250-sheet paper tray in standard configuration and lacks an envelope feeder. However, it prints manually fed envelopes and transparencies, and a legal-sized paper tray is available for $78.95. A print drum lasts about 10,000 pages and costs $179.95 to replace, while a $36.75 toner cartridge is good for 3000 pages, giving the Q-8010 a consumables cost of 2.9 cents per page at 5 percent ink coverage. Kyocera Unison Inc., 1321 Harbor Bay Pkwy. #100, Alameda, CA 94501; 800/334-6056, 415/748-6680. —*Susan Lusty*

**Reader service no. 662**




**With both PostScript and LaserJet Series II emulations, plenty of RAM, and on-board processing, the 10-ppm Q-8010 is ready for any work-group printing chore—whether graphics or text.**

## Acer, AST

*(continued from p. 85)*

64MB. Like the AST machine, the Acer offers five half-height drive bays, and the 6.3-by-20.9-by-16.5-inch cabinet has six 32-bit EISA expansion slots. You'll lose one to a video adapter and, if you choose either one of the optional ESDI drives, another to a hard disk controller.

The AST Premium 486/25E EISA comes with just 2MB of RAM upgradable to a respectable 36MB, and no external cache. Its 6.25-by-19.25-by-16.5-inch case sports seven EISA 32-bit slots, but after you've added the CPU card and a video adapter, you'll only have five available—four if you go for the optional 320MB ESDI drive.

The Acer 1200's basic configuration supplements the i486's built-in 8K memory cache with a 128K external write-back cache. One parallel and two asynchronous serial ports are standard, as are the 1.2MB floppy drive and controller. Also included are a 101-key keyboard, a serial mouse, DOS 4.01, *GW BASIC*, *Windows/386*, an EMS 4.0 expanded memory manager, and a system utilities program. The 1200 has a 230-watt power supply and features a 12-month warranty that includes 4 months' on-site service. The system sells for $10,995 without a hard disk, $12,760 with a 170MB ESDI drive, and $13,240 with a 380MB ESDI drive.

The basic AST Premium 486/25E Model 5 comes with a 1.2MB floppy drive, a 220-watt power supply, a 101-key keyboard, a parallel port, and two asynchronous serial ports for $9745. A diagnostics utility disk includes an EMS 4.01 expanded memory manager. The AST has a 12-month parts and labor warranty. The Model 115 adds a 110MB hard disk with an embedded AT controller for $11,245, while the $13,395 Model 325 features a 320MB ESDI drive. Also available is a tower version with six half-height drive bays, ten 32-bit EISA expansion slots, and up to 2GB of optional internal storage for a starting price of $10,245. —*Rex Farrance*

Acer America Corp., 401 Charcot Ave., San Jose, CA 95131; 408/922-0333, 408/922-0176 (fax).

**Reader service no. 663**

AST Research Inc., 16215 Alton Pkwy., Irvine, CA 92718-9658; 714/727-4141, 714/727-9363 (fax).

**Reader service no. 664**

I write pretty well.

HOMONYM ERROR

Really, my only problem have too do with grammar.

You know--possessives, plurals, and punctuation--when I have time, I look each one up.

My friend swears by Grammatik IV.

He says it corrects thousands of grammar errors, easily, like a spelling checkers.

Well, Grammatik *did* improve his writing.

And writing error are embarrassing.

I probably don't need it, but for only $99 and a money-back guarantee, maybe I should try it...

What do you think?

There are eight errors in the sentences above. How many can you find? (The answers are below, but don't cheat.) Grammatik IV found all eight in 15 seconds. Which is why it's guaranteed to improve your writing within 30 days or your money back. Just press a hot-key combination inside your favorite word processor,* and Grammatik proofreads each sentence for errors in grammar, style, punctuation, usage and spelling. You'll have clear, concise, and greatly improved writing in minutes.

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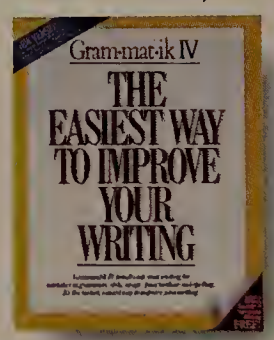


ANSWERS: Sentence 2–"problem have" (Verb Agreement: The singular noun *problem* may be used incorrectly with the plural form of the verb *have.*) Sentence 2–"too" (Homonym: Unless you mean also or overly for *too,* you probably mean *to* or *two.*) Sentence 3–"each one" (Long-winded or wordy) Sentence 3–"one up." (Avoid ending a sentence with a preposition.) Sentence 5–"a spelling checkers" (Article: Usually *a* is used with a singular noun or phrase.) Sentence 7–"And" (Cliche: Use sparingly to start a sentence.) Sentence 7–"are" (Verb Agreement: Be sure you are using *are* with a plural subject.) Sentence 8–"..." (Ellipsis mark: The proper form is....)

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**New Grammatik IV works inside WordPerfect® 5.0/5.1, Microsoft Word® 5.0, WordStar® 5.5, Professional Write® 2.1, and XyWrite III, and works directly on files created by 33 word processors. Grammatik is a trademark of Wang Laboratories, Inc.* *© 1989 Reference Software International, 330 Townsend St., Suite 123, San Francisco, CA 94107. (415) 541-0222.*

**Circle 282 on reader service card**

MicroMaster 386/33

## A 33-MHz 386 Transfusion for That Anemic PS/2

With the newest 80386 CPU upgrade board from Aox, your Model 50, 60, or 50 Z can run 32-bit software like a high-end PS/2. Using the bus-master capabilities of IBM's Micro Channel architecture (MCA), the MicroMaster 386/33 CPU becomes the system host, leaving the original 80286 CPU to handle low-level I/O chores.

A Model 50 equipped with the MicroMaster may realize as much as a fivefold increase in performance. And at 33 MHz with 32K of external cache, the new upgrade even merits a look from Model 70 owners whose multitasking, data base, *Windows*, or CAD applications have outgrown their machines. If your only problem is that spreadsheet recalcs take too long, Aox also makes cached 20-MHz and 25-MHz versions of the MicroMaster 386. A 25-MHz 486 is in the works —architecturally identical to the 386 model, sans external cache.

Each upgrade board takes a 16-bit MCA slot and holds up to 4MB of directly accessible, CPU-speed 32-bit memory. The Aox boards support up to 15.5MB of memory, but memory not on the Aox board is accessed at the PS/2's 10-MHz bus speed. There's a socket for an 80387 math coprocessor, which will help pare power-hungry applications down to size.

This is about as significant an upgrade as you can make. But Aox has the blessing of IBM, so plugging in a MicroMaster won't affect your Big Blue warranty. The company says it has tested the boards with a wide range of operating systems and applications. Compatibility problems have come up only on the hardware side, when other third-party MCA boards are installed, Aox says.

You need at least 1MB of on-card memory in addition to the external cache, but Aox doesn't sell it: You have to get it from your reseller or by mail order. Without memory, the MicroMaster 386/33 retails for $2495. The 20-MHz and 25-MHz 386 models are priced at $1495 and $1795, respectively. The 486/25, out later this year, will cost $4695 without memory. Aox Inc., 486 Totten Pond Rd., Waltham, MA 02154; 800/232-1269. —*Mark Henricks*

**Reader service no. 661**

Tandon 486/25

## 486 With Frills

Tandon's 486/25 dresses up the already imposing i486. An EISA bus, extra caching memory, and a write accelerator are big pluses if you're running demanding network software or power-hungry operating environments.

Tandon engineers have decided that the i486's internal 8K memory cache is nice but not big enough; they've added a 64K high-speed external memory cache on the motherboard to run the 486 more effectively in fast burst mode. Data, of course, flows two ways, and the Tandon's PowerPoster write accelerator works like cache memory but in the other direction, accepting data *from* the 486.

This is one of the first desktops built around the i486 and EISA from the ground up. To make the match work, Tandon came up with a new memory manager for the 486/25. You can split up to 256MB of system memory into 16K pages. Each page can be marked as cachable or not, write-protected or not, or devoted to shadow RAM.

**The Tandon 486/25 beefs up the power of the i486 processor with a 64K memory cache on the motherboard and a fast EISA bus.**

The impressive list of extras leaves plenty of room inside. The 21-by-16-by-6-inch system can be configured with up to 64MB of motherboard memory. You also have six 32-bit EISA slots and a pair of 8/16-bit ISA slots.

The basic Model 100 system, priced at $11,990, comes with 2MB of RAM, a 1.2MB floppy drive, and a 110MB, 28ms hard drive, but no monitor. A $25,000 version fills the remaining four half-height drive bays with a 670MB ESDI hard drive and a 650MB rewritable optical drive with removable media. Tandon Corp., 609 Science Dr., Moorpark, CA 93021; 805/378-3000. —*Mark Henricks*

**Reader service no. 670**

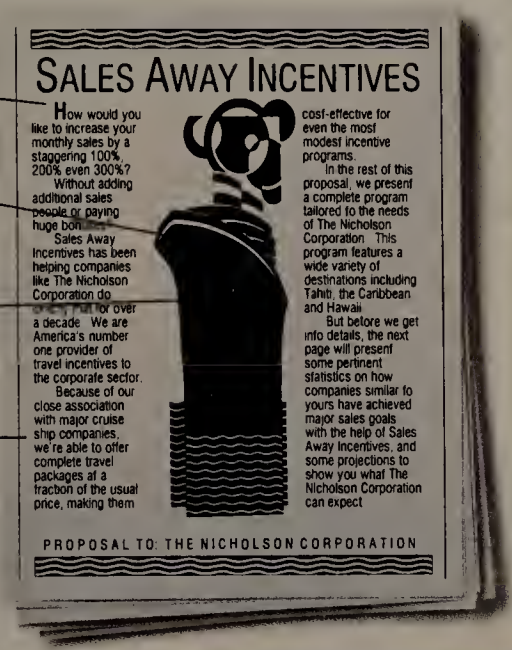
# The new MultiMate. Productivity beyond words.

*Create nearly any font size.*

*Easily integrate graphics into your document.*

*Import graphics from most popular file formats.*

*Design documents with multiple columns.*



SALES AWAY INCENTIVES

How would you like to increase your monthly sales by a staggering 100%, 200% even 300%?

Without adding additional sales people or paying huge bonuses.

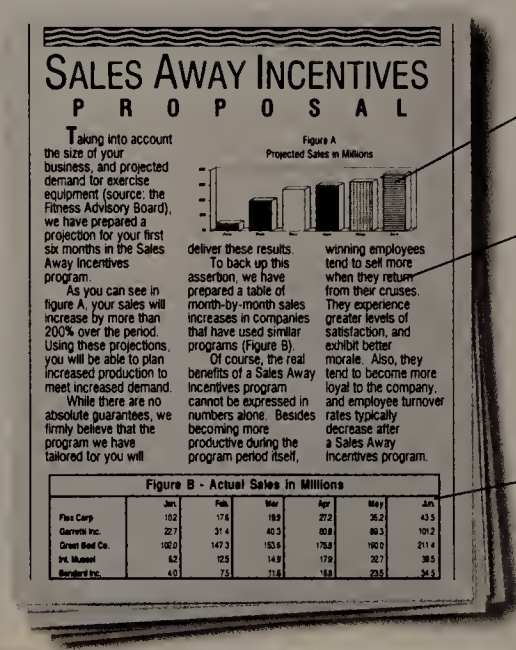
Sales Away Incentives has been helping companies like The Nicholson Corporation do [illegible] for over a decade. We are America's number one provider of travel incentives to the corporate sector.

Because of our close association with major cruise ship companies, we're able to offer complete travel packages at a fraction of the usual price, making them cost-effective for even the most modest incentive programs.

In the rest of this proposal, we present a complete program tailored to the needs of The Nicholson Corporation. This program features a wide variety of destinations including Tahiti, the Caribbean and Hawaii.

But before we get into details, the next page will present some pertinent statistics on how companies similar to yours have achieved major sales goals with the help of Sales Away Incentives, and some projections to show you what The Nicholson Corporation can expect.

PROPOSAL TO: THE NICHOLSON CORPORATION



SALES AWAY INCENTIVES

P R O P O S A L

Taking into account the size of your business, and projected demand for exercise equipment (source: the Fitness Advisory Board), we have prepared a projection for your first six months in the Sales Away Incentives program.

As you can see in figure A, your sales will increase by more than 200% over the period. Using these projections, you will be able to plan increased production to meet increased demand.

While there are no absolute guarantees, we firmly believe that the program we have tailored for you will deliver these results.

To back up this assertion, we have prepared a table of month-by-month sales increases in companies that have used similar programs (Figure B).

Of course, the real benefits of a Sales Away Incentives program cannot be expressed in numbers alone. Besides becoming more productive during the program period itself, winning employees tend to sell more when they return from their cruises. They experience greater levels of satisfaction, and exhibit better morale. Also, they tend to become more loyal to the company, and employee turnover rates typically decrease after a Sales Away Incentives program.

Figure A
Projected Sales in Millions

Figure B - Actual Sales in Millions

| | Jan. | Feb. | Mar | Apr | May | Jun. |
|---|---|---|---|---|---|---|
| Flex Corp | 10.2 | 17.6 | 19.9 | 27.2 | 36.2 | 43.5 |
| Garrotti Inc. | 22.7 | 31.4 | 40.3 | 80.8 | 89.3 | 101.2 |
| Great Bed Co. | 102.0 | 147.3 | 153.6 | 175.8 | 190.0 | 211.4 |
| Int. Mussel | 6.2 | 12.5 | 14.9 | 17.9 | 22.7 | 38.5 |
| Sandard Inc. | 4.0 | 7.5 | 11.6 | 18.8 | 23.5 | 34.5 |

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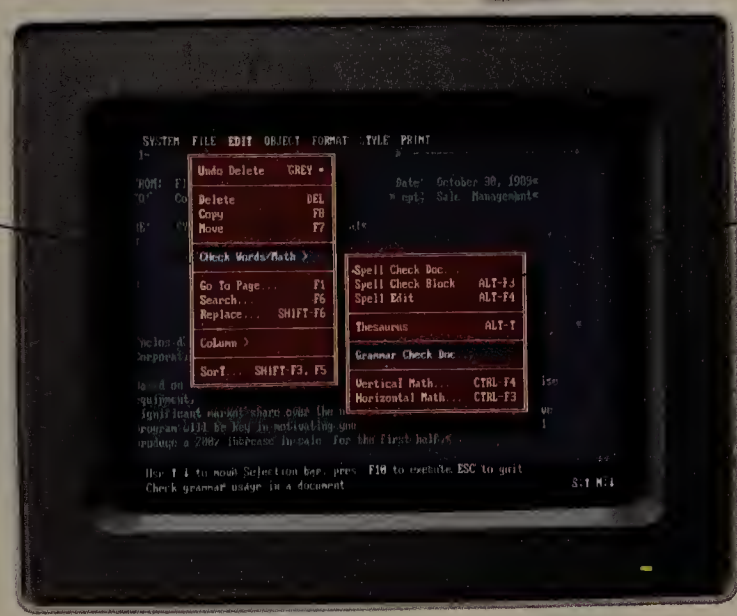
*Integrated grammar checker (Grammatik™ IV) helps you enhance the style and effectiveness of your documents.*

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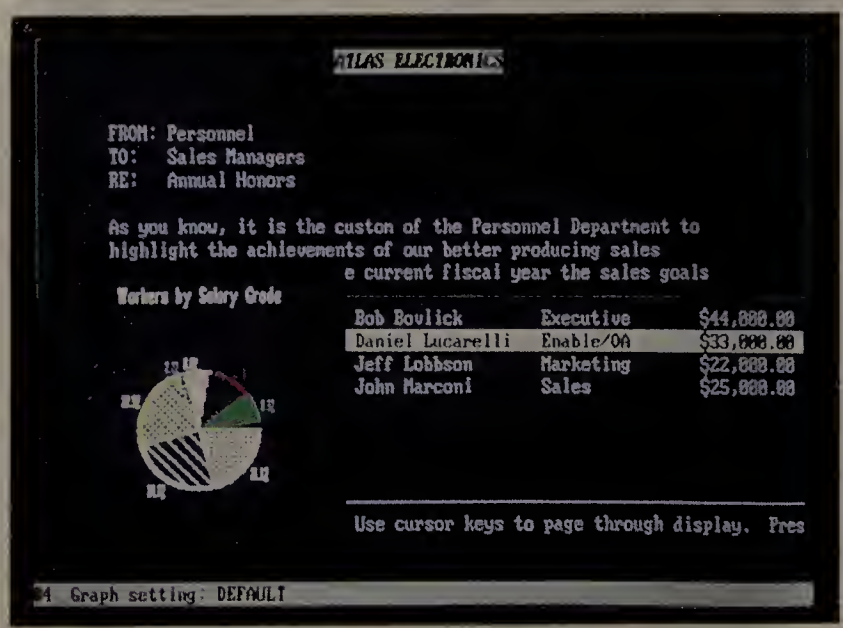
Enable/BP

## Integrated Starter Kit Targets Business Productivity




**Enable/BP lets you view up to eight files on screen simultaneously and move data among word processing, data base management, spreadsheet, graphics, and telecommunications modules easily.**

*Enable/BP* is the first big step on the integrated software upgrade path. Like its $695 big brother, *Enable/OA*, this $199 program puts word processing, data base management, spreadsheet, graphics, and telecommunications in one package.

*Enable/BP* modules share the command scheme of *Enable/OA*. That shortens the learning curve, smooths the upgrade path to *OA*, and limits time spent studying infrequently used modules. A powerful windowing capability lets you view up to eight files on screen simultaneously and move data among modules easily.

Unlike some integrated products, *Enable/BP* isn't a spreadsheet augmented with word processing and data base management, or a word processor–outliner padded with spreadsheet and data base. Nor is it *OA*, which has a full 3-D spreadsheet, a billion-record data base, and application development tools.

But most of what you'll need for small-business or departmental computing is here. For example, the full-featured word processor checks spelling, generates indexes and tables of contents, and handles headers, footers, and footnotes. The graphics module supports 3-D graphs in color or black-and-white, letting you add and edit headers and legends. *Enable/BP* macro tools should be ample for most users.

*Enable/BP* makes the ideal base package for a work group, and its extensive file conversion capabilities ensure that workgroup members won't have to abandon their favorite stand-alones. It reads and writes ASCII, DCA, *WordStar*, *EasyWriter*, *Volkswriter*, *MultiMate*, and *Peachtext* formats. It also can import and export *1-2-3*, *SuperCalc 3*, SYLK, DIF, *dBASE*, and *PC-File III* files.

*Enable/BP* requires at least DOS 2.0, 384K, and a graphics card. An upgrade to *Enable/OA* is $185, and a four-user *Enable/BP LAN* network version is $495. Enable Software Inc., Northway Ten Executive Park, Ballston Lake, NY 12019; 800/888-0684. —*Mark Henricks*

**Reader service no. 667**

Faxit for Windows

## Fabulous Pop-Up Faxes—From Windows to the World

With fax rapidly replacing much paper mail, the ho-hum default fonts you get from the software bundled with most fax boards just don't cut it anymore. Good news for *Windows* users: Alien Computing's *Faxit* software lets you send off font- and graphics-rich facsimiles of your documents. And Alien is extending *Faxit* capability to many boards that don't yet support the DCA/Intel Communicating Applications Specification (CAS) protocol.

Consuming between 32K and 100K of memory when in use, *Faxit* pops up over any *Windows* application, letting you convert your document, complete with graphics and *Windows* or Bitstream fonts, into 200-by-100-dpi or 200-by-200-dpi Group III fax output. *Faxit* masquerades as a *Windows* printer driver, but instead of merely redirecting printer output as some of its counterparts do, *Faxit* rasterizes your file directly from *Windows*' graphics commands. Thus you avoid the time-consuming two-step translation process, and aspect ratios are more precise.

*Faxit*'s capabilities extend far beyond the file conversions offered by some fax boards. You can control the entire fax process, including selecting recipients from a dialing directory, printing and viewing faxes, and setting up unattended, timed transmissions. You can even receive faxes in the background.

These benefits previously were limited to CAS-compatible boards such as the Intel Connection CoProcessor, but *Faxit* now supports the Xerox/Datacopy MicroFax. By midyear it should also work directly with fax boards from Panasonic, Relisys, OAZ, Brooktrout, Hayes, GammaLink, and The Complete PC.

*Faxit* retails for $179, and if you buy the Intel Connection CoProcessor before July, it costs only $19.95. Alien Computing, 37919 50th St. E, Palmdale, CA 93550; 805/947-1310. —*Eric Brown*

**Reader service no. 665**

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Regal SX

## Full-Featured 386SX Luggable for a Featherweight Price

**The Regal SX puts 32-bit computing, a gas plasma display, and 40MB of memory in a luggable box that's as much as $3000 less than similarly configured portables—and adds a money-back guarantee.**

Low-priced 386SX machines have sometimes seemed slow in coming, but the Regal SX transportable from Micro Express signals that the wait is over. For $2499 you get a 386SX with 1MB of RAM on the motherboard (expandable to 8MB on the motherboard and 16MB overall), an easy-to-read EGA gas plasma display showing four scales of gray, and a hefty 40MB hard disk. That puts the 20-pound portable's price tag as much as $3000 below that of some comparable SX desktops.

Nor does Micro Express scrimp on other features. Two full-sized 8/16-bit expansion slots, an 8-bit slot, and a socket for an 80387SX math coprocessor are built into the proprietary motherboard. Moreover, to make data transfer from one floppy format to another easier, the Regal SX's standard equipment includes an internal 1.44MB 3½-inch and an external 1.2MB 5¼-inch floppy that you plug into a dedicated port. You also get two serial ports, one parallel port, and an EGA video port.

A special key lets you cycle through various color-to-gray-scale translations so you can run color-based applications without reinstallation. And the 92-key keyboard features dedicated cursor and paging keys and a numeric keypad. Micro Express provides a full 15-month warranty and an unconditional 30-day money-back guarantee. Micro Express, 1801 Carnegie Ave., Santa Ana, CA 92705; 800/642-7621, 714/852-1400. —*Michael Goodwin*

**Reader service no. 666**

MicroLaser PS35

## PostScript Printing, Desktop Style

If you've put your desktop publishing business (or annual report) on hold until PostScript printer prices drop to humane levels, get set to go back to work. Texas Instruments' MicroLaser PS35 offers true Adobe PostScript for only $2999 list.

Considering that a $6000 price tag is not unusual for a PostScript laser printer, you might expect the PS35 to be short on features. Its 6-ppm Sharp engine is 2 ppm slower than average, but this 300-dpi printer includes 35 scalable outline fonts and comes with a standard 1.5MB of RAM, expandable to 4.5MB.

An internal paper tray accommodates 250 sheets and handles six sizes of paper as well as transparencies, invoices, labels, and envelopes. Offices with heavy printing loads can add a second 250-sheet tray. What's more, with a small footprint and a low 33-pound weight, the MicroLaser PS35 is desktop ready.

The $189 print drum has a 40,000-page life, and the $149 developer kit is good for 20,000 pages. A separate $69 toner kit needs to be changed every 3000 pages. That puts the per-page consumables price at 3.5 cents with 5 percent ink coverage, only slightly higher than the 3.1-cent cost of running an HP LaserJet Series II without PostScript. Texas Instruments Inc., Information Technology Group, P.O. Box 202230, Austin, TX 78720-2230; 800/527-3500. —*Michael Goodwin*

**The MicroLaser PS35 offers 6-ppm printing and true Adobe PostScript for about half the price you would expect to pay. The 300-dpi printer includes 35 scalable outline fonts and 1.5MB of RAM.**

**Reader service no. 669**

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**Circle 302 on reader service card**

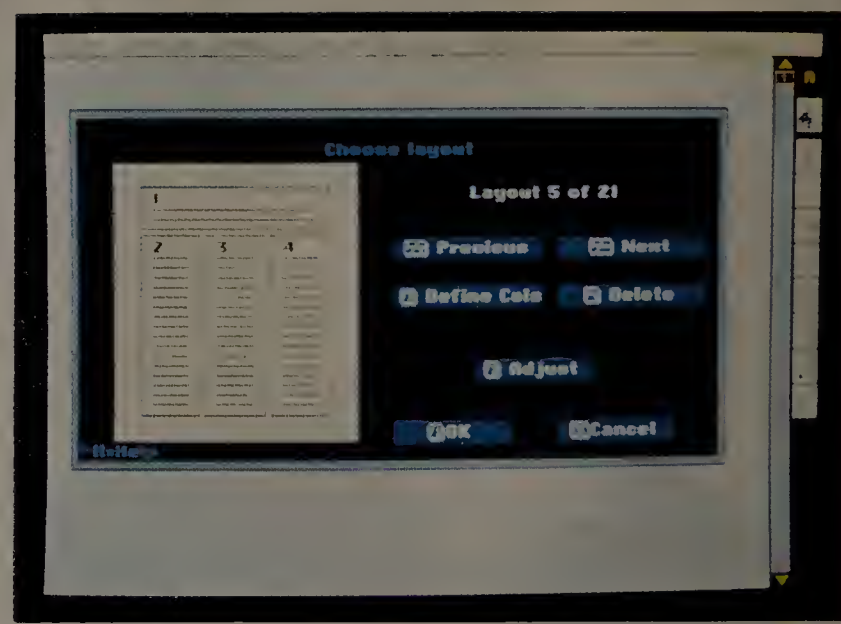
PFS: First Publisher 3.0

## A Publisher With Extra Punch

For many beginning and casual users, *PFS: First Publisher* was the first desktop publisher. It still often plays that role, but the bar has been raised on the quality of business documents. Software Publishing Corporation hopes to meet the challenge with version 3.0 of its popular product, which offers near-instant font creation capabilities and better-looking output.

Few *First Publisher* customers want to become DTP mavens, so SPC's challenge has been to increase capabilities without boosting complexity. New context-sensitive help and the addition of color to the interface go part of the way. A layout gallery of 21 geometric elements that lets you quickly format any of three paper sizes in landscape or portrait mode also helps. Text can flow through these boxes and rectangles and wrap around art.

But fast fonts are the real news in version 3.0. The addition of Bitstream's *Speedo* lets you scale Fontware version 3.0's Swiss and Dutch fonts from 9 to 70 points virtually on the fly. Since you can get fonts any time you want, you won't have to painstakingly install and then manage them in various sizes. *First Publisher 3.0* also has five other Bitstream text and headline families in 22 fixed point sizes. You can output to about 160 different laser and dot matrix printers at resolutions of 300 dpi or better.




**PFS: First Publisher 3.0 adds context-sensitive help, color, and a layout gallery of 21 geometric elements for quick page design.**

The $149 *First Publisher* still works on an 8086, requiring DOS 2.0 or later, 640K of memory, and a CGA or better graphics card; a mouse and a hard disk are recommended. Software Publishing Corp., 1901 Landings Dr., P.O. Box 7210, Mountain View, CA 94039-7210; 415/962-8910. —*Mike Hogan*

**Reader service no. 673**

Clarion Professional Developer 2.1, Clarion Report Writer

## Pro-Strength Data Tools for Novices

Clarion Software built its reputation selling powerful, easy-to-use tools to data base application developers. Now it wants to bring those tools' capabilities to novice users as well with an upgrade of *Professional Developer* and the premiere of a report generator.

*Clarion Report Writer* is a menu-driven, standalone tool for creating custom queries and reports from Clarion, dBASE, DIF, or comma-delimited ASCII files. It works with them in combination, producing relational reports from files in otherwise incompatible formats.

The tools for creating filters and calculated fields are all accessible through pop-up menus, greatly reducing the risk of error. Before a report is printed, it can be sent to a text file or previewed on the screen in a mode that allows you to scroll back and forth.

Application developers can predefine layouts and relationships for their clients to use when designing reports. Fields and definition files can be password protected, allowing developers to protect users from their own mistakes. You can buy *Clarion Report Writer* as a stand-alone version or bundled with version 2.1 of *Clarion Professional Developer.*

*Professional Developer* now includes a Quick Start feature, borrowed from *Clarion Personal Developer,* that can generate a simple flat-file application from little more than a file layout. To speed up development, *2.1*'s code generator ignores modules that haven't changed since you last wrote code. It supports 2GB of virtual memory. Disk drives and expanded and extended memory can be used for buffers, caches, memory tables, and other internal tasks, but not for running code.

*Clarion Report Writer* retails for $199; *Professional Developer 2.1* with *Report Writer* is $845. *Developer* upgrades are $100 for those who bought version 2.0 after November 15, 1989, and $150 for other users. Clarion Software, 150 E. Sample Rd., Pompano Beach, FL 33064; 800/354-5444, 305/785-4555, 305/946-1650 (fax). —*Lincoln Spector*

**Reader service no. 675**

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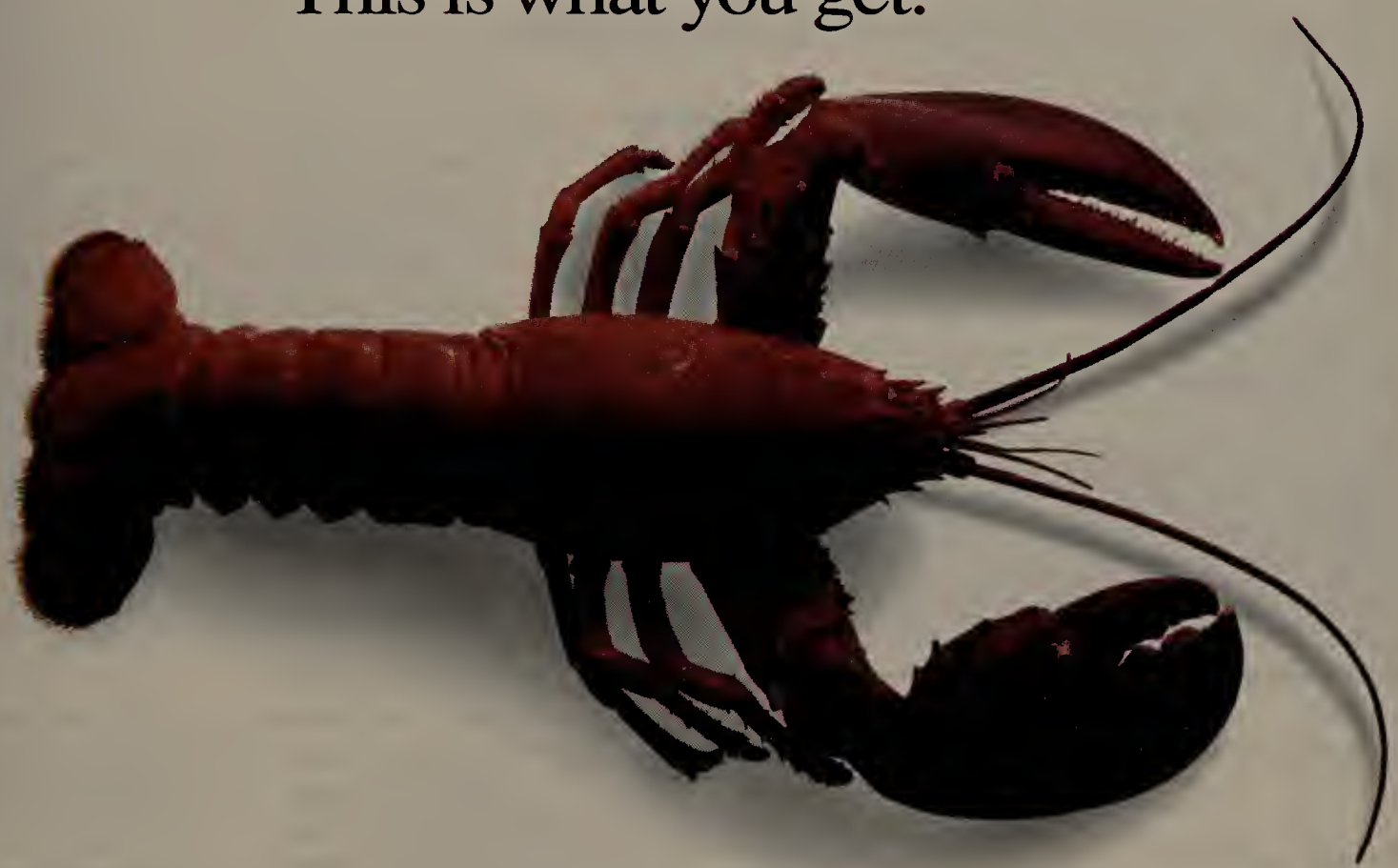

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DOS Partner 1.1

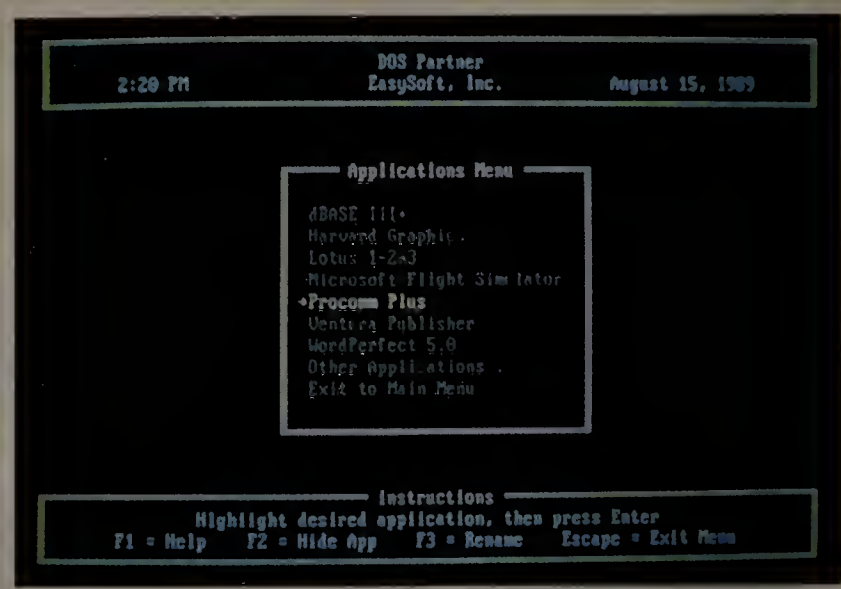
## Look, Ma, No More DOS Commands!

*DOS Partner* can read any of the 400 most popular applications from your hard disk and automatically build a menu system that includes application, file management, and drive management screens. It then lets you perform any DOS transaction without knowing DOS syntax.

You can incorporate your own offbeat application, and version 1.1 lets you peek into many file formats for a quick scan of a file that you may be about to copy, delete, or move. Formats supported include *WordPerfect 4.2* through *5.1*, *WordStar*, *WordStar 2000*, *XyWrite*, *1-2-3*, *Quattro*, and ASCII.

Other enhancements to the DOS shell include mouse support and the ability to operate on 26 local or network drives. Version 1.1 supports 3Com, Novell, and 10Net networks. *DOS Partner* requires DOS 2.0 or later and 300K of memory in a 512K machine when active, but it shrinks to a 6K kernel when you run an application. It sells for $99. EasySoft, Inc., 1215 Hightower Trail #B100, Atlanta, GA 30350; 404/992-4140. —*Mike Hogan*

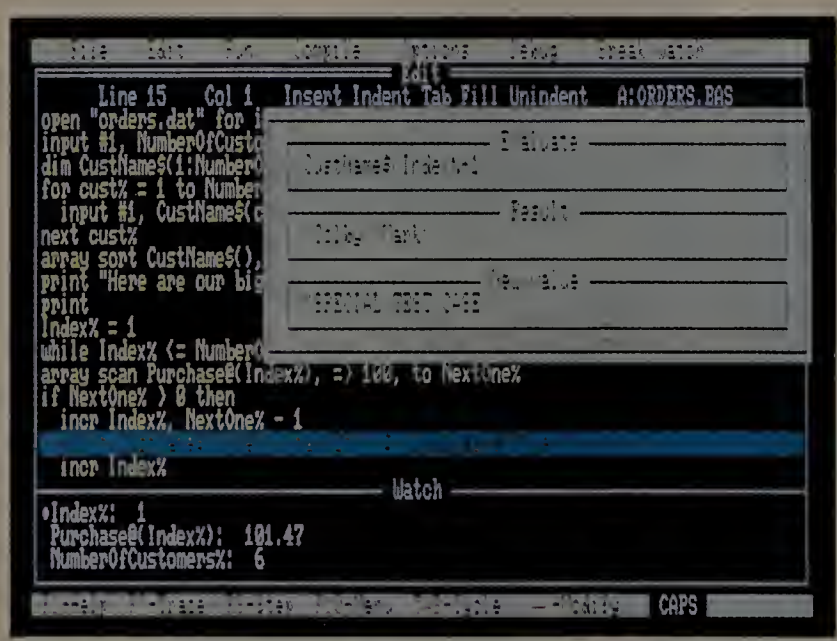
**Reader service no. 677**




**DOS Partner automatically builds a menu system listing the applications on your hard disk and lets you peek into many types of files.**

PowerBASIC 2.0

## Turbo Basic Compiler Reborn as PowerBASIC




**PowerBASIC 2.0 adds speed enhancements for your applications, including fixed- and floating-point math and unlimited space for strings.**

Borland has returned the rights to the *Turbo Basic* compiler to developer Bob Zale, who has revamped it and released it through Spectra Publishing under the name *PowerBASIC 2.0*.

Changes in the handling of mathematics are particularly dramatic; fixed- and floating-point binary-coded-decimal (BCD) formats have been added for greater speed and accuracy. When programs are run on systems without coprocessors, you have the choice of handling math routines with the traditional coprocessor emulator or with a new procedural math option that results in faster but larger executable files. Programs will still take advantage of a 387 coprocessor if one is available.

String space is no longer limited to 64K but can use all available memory. Array support has been improved with four commands for sorting, scanning, adding, and removing array elements. Data structures and records can be defined at run time, letting you create applications in which your users can design their own data structures. A debugger has been added, complete with single step, break points, watch variables, and immediate evaluation and modification.

*PowerBASIC* retails for $109.95; *Turbo Basic* users can upgrade for $59. The software requires DOS 2.0 or later and 640K of memory. Spectra Publishing, 1030D E. Duane Ave., Sunnyvale, CA 94086; 408/730-9291. —*Lincoln Spector*

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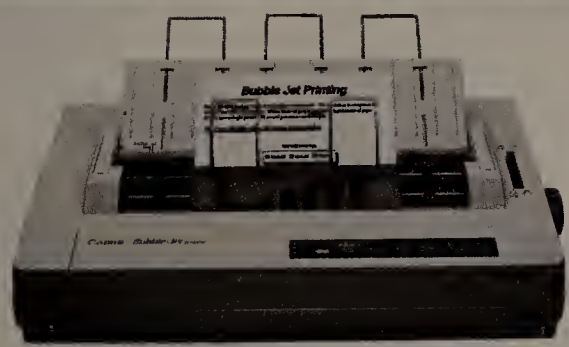


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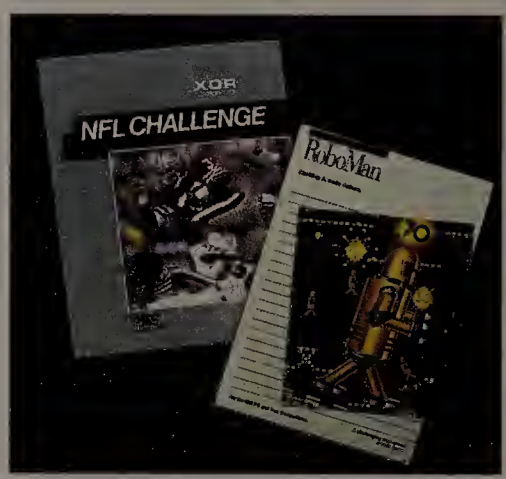


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— B.C., El Paso, Texas

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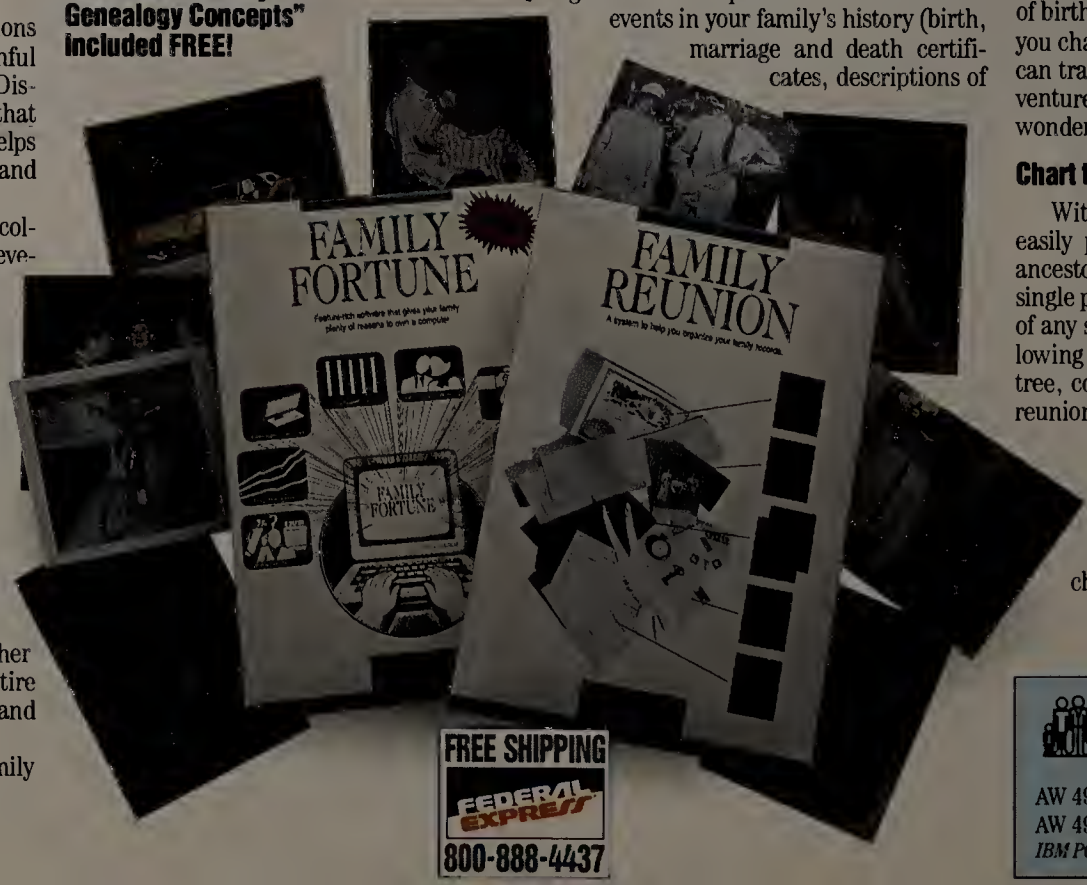


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AW 4970 **Family Reunion** 5¼" . **$69.95**
AW 4975 **Family Reunion** 3½" . **$69.95**
*IBM PC, XT, AT, PS/2, compatibles; 512K.*

Circle 259 on reader service card

# SYSTEM MAINTENANCE DEPARTMENT

## "What's Going on 'Under the Hood' of My Computer?"

FREE SHIPPING FEDERAL EXPRESS 800-888-4437

Stop! Don't reach for the screwdriver to open your computer when a problem or conflict arises. Just pop in System Sleuth and display detailed information on how the system is currently configured, partitioned and organized. Using this remarkable utility, you'll optimize the use of high memory, RAM, extended and expanded memory.

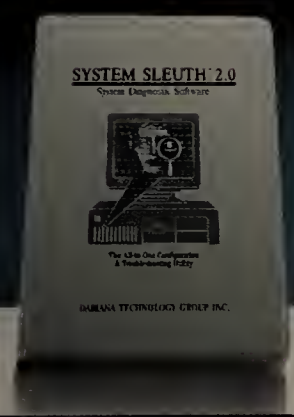
System Sleuth is an easy-to-use, advanced "passive diagnostic" system that probes deep into the heart of your PC, illuminating secrets (and pitfalls) — without damaging your precious data. Extensive help screens aid in understanding of how your computer works — and why it won't! System Sleuth also gives you the information necessary to make smart configuration decisions when adding new hardware and software — maximizing its performance — and avoiding conflicts.

In addition, System Sleuth helps you avoid needless repair bills and provides details that can be helpful when obtaining technical support from hardware and software manufacturers — your system status is displayed right on the screen.

You'll have instant access to information on processor and card types, BIOS date, DOS version, ports used and memory installed, including a complete rundown of what's contained in each 64-Kbyte segment up to 1 Mbyte. Display TSRs loaded, their functions and memory allocation, interrupt vector tables, device drivers loaded (and attributes) and disk information (including bad tracks).

If you've ever experienced board interrupt conflicts, you'll now see a complete list of all IRQs (interrupt requests), showing which are enabled and their designated devices.

**System Sleuth Up-to-the-Second System Status Just $149.00**




**DARIANA TECHNOLOGY**

AW 1060 **System Sleuth**
5¼" & 3½" ..... **$149.00**
*IBM PC and compatibles. Requires 256K.*

## "I Think There's Something Wrong With My System."

Sometimes, it's nice to be assured that everything about your computer is in working order — it's also comforting that if there is a problem, there's an easy way to get the system flying again without wasting time and money.

Introducing Check-It. This is heavy-duty system diagnostics that can detect and pinpoint any problem — including floppy and hard disk miscues — without damaging any data. It checks for any problems with your motherboard, memory, drives, video subsystem, communications ports, and peripherals like your printer, mouse, joystick and keyboard. Check-It will also run various benchmark tests, so you can measure the performance of your machine.

### It Locates Bad Chips for You!

In the event of a problem with RAM, Check-It can actually tell you precisely which chip is defective—no more "Chip Roulette" trying to find the problem. Check-It provides complete system status information on: Configuration (equipment and system revision data), Interrupt Usage (assignments for devices and programs), DOS Device Drivers (DOS set-up) and CMOS (hard disk set-up) Table.

### Diagnostic Tests.

- Main System Board — Complete diagnostics of main processor (real and protected mode), numeric co-processor, interrupt and DMA controllers.
- Memory — Up to 16Mb of Base and Extended memory, selectable by address range with optional test patterns and multiple passes.
- Hard/Floppy Drives — Non-destructive tests with detailed error-reporting.
- Video Subsystem — Character and graphics modes with on-board RAM test included.
- Communications Ports — Includes internal/external loopback tests.
- Printers — Supports IBM, Epson and generic dot-matrix printers. Also supports Hewlett-Packard LaserJet.

**TouchStone**
Software Corporation

AW 1070 **Check It!** 5¼" & 3½" **$149.00**
*IBM PC, XT, AT, PS/2, compatibles; 256K.*

**Check-It The Diagnostic System. Just $149.00**

## Your Hard Disk is a Time Bomb!

**Please Read This Carefully If You Own A Hard Disk.**

### Fragmentation Is Fatal!

When your hard disk was new, it ran lean and swift, retrieving files in just a few seconds. But as you added programs and files, your hard disk became fat and sluggish — in fact *a fragmented, "dirty" hard disk can take up to 100 seconds to retrieve a file that used to take just 10 seconds* — that's ten times slower!

The problem? Fragmentation kills hard disk performance. It causes excessive head movement across the media, creating bad spots throughout the drive. It's aggravating — and it's dangerous! A fragmented hard disk, left unmaintained, is almost certain to crash. That means major data loss. Disk Optimizer 4.0's sleek, *easy-to-use menu system* makes hard disk maintenance simple.

### Why Optimize My Disk?

Unfortunately, DOS is doing its best to slow hard disks down — by breaking files up into pieces. Storing different chunks in different places. As a result, loading is slower. Sorting is slower. Everything takes longer because your hard disk has to chase around picking up and laying down different pieces of your file.

After un-fragmenting with Disk Optimizer, a file that once occupied twenty different sectors in twenty different locations is now back in one contiguous piece. The next time your drive reads it, there's just one place it has to look.

### Absolutely Disaster Proof.

...Even if you yank the plug from the wall in the middle of the program! Disk Optimizer checks the un-fragmented version for completeness and integrity. Then — and *only* then — does it go back and erase the fragmented version.

**SOFTLOGIC SOLUTIONS**

AW 3280 **Disk Optimizer** 5¼" .. **$69.95**
AW 3285 **Disk Optimizer** 3½" .. **$69.95**
*IBM PC and compatibles. DOS 2.1 and above.*
***Buy Disk Optimizer — Get Double DOS or Magic Mirror FREE!***

## Pack More of Your Data Onto Less Disk Space!

You know what happens. The more you use your computer, the more information you create. And the faster you fill up your disk.

The 10 MB drive that once seemed enormous is now jammed with important files. That 20 MB that should have lasted years is crowded in a matter of months.

Of course, you could always go out and buy a bigger hard drive. Or you could get Cubit. This remarkable software is designed to squeeze the maximum usable storage space from your hard disk, as well as your floppies and tape cassettes.

Use Cubit, and a word processing file that once took up 20K now takes as little as 10K. The archival records you use to keep on floppies now stay right on your hard drive, providing instantaneous access in a minimum of precious space.

### What Is CUBIT?

In brief, Cubit is an advanced software tool that automatically reduces the number of bytes required to store a file, then converts the file back to its original size when retrieved. It's sort of like taking the air out of a spare tire while it's in your trunk, then reinflating it when you need it — automatically, safely.

Some programmers call this effect "data compression," others "disk expansion." Either way, the result is the same. All your magnetic media is made to store information in the most efficient and economical way possible. Regardless of the form your data takes.

The vast majority of data created on PC's is standard ASCII text — letters, numbers, punctuation and other English language symbols. You can expect excellent performance with all kinds of data. Including spreadsheet files, program code, graph and image files.

**SOFTLOGIC SOLUTIONS**

AW 3310 **Cubit** 5¼" ..... **$69.95**
AW 3315 **Cubit** 3½" ..... **$69.95**
*PC-DOS/MS-DOS 2.0 or higher, 128K RAM.*
***Buy Cubit — Get Double DOS or Magic Mirror FREE!***

Circle 259 on reader service card

# Prepare Powerful Presentations With Plenty of Punch!

### DrawPerfect — Presentation Software from the WordPerfect People...

The big one.

The opportunity you've busted your tail for months trying to get. One chance to steal a tidy piece of business from your competitor. All you've got to do is blow the client away with an incredible presentation.

...It's time to sit down with DrawPerfect and put its power to work.

Instantly, an electronic palette of backgrounds, typestyles, graphics, patterns and special effects are at your command. Create presentations, overheads, slides and flyers packed with vibrancy and flair. Use fades, sweeps, overlays and other innovative new tools that produce results you never even imagined. DrawPerfect makes your presentations crisp and expressive.

### Integrates with WordPerfect...

Create graphs, charts and other graphic elements in DrawPerfect and mix them nicely with your WordPerfect documents. Or, integrate text from WordPerfect into your presentations.

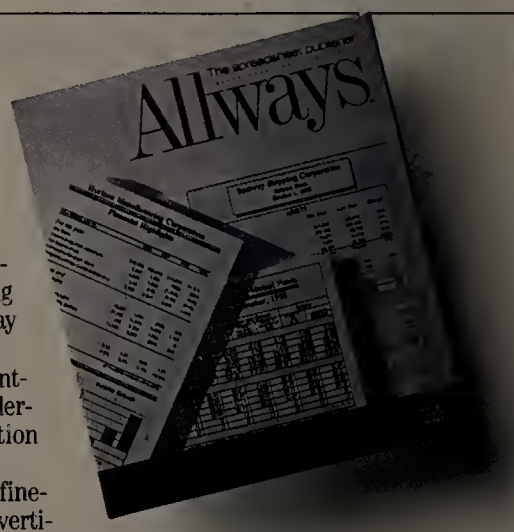
### Legendary Text Handling...

Adding text to your presentations, graphs and charts is simple, flexible and full of creative possibilities. DrawPerfect contains 25 built-in fonts that can be quickly sized, rotated and colorized.

Includes 500 graphic images and devices. Open the box and dive into a great library of graphics, symbols, backgrounds, arrows, and maps.

**WordPerfect**
CORPORATION
AW 1050 **DrawPerfect**
5¼" & 3½" ..... **$495.00**
*Requires Lotus 1-2-3 2.0 or 2.01, and 128K.*

# Make Your Spreadsheets Look Like a Million Bucks!




It's designed to make every worksheet you print look crisper, more credible, more presentable than ever before — working directly from 1-2-3. With menus and commands that look and feel just like 1-2-3 itself.

Allways gives you an astonishing range of formatting and printing options. And its WYSIWYG display eliminates all the guesswork.

Use up to 8 typefonts on any printout. Add emphasis with bold or underline. Highlight important information with light or dark shade.

Adjust the height of a row, or fine-tune the width of a column. Draw vertical and horizontal lines along any cell border. Enclose data in boxes, and for the bottom line, double underline.

### Extensive Font Support.

With Allways, you'll be able to see any of the hardware fonts your printer provides. And Allways comes with three soft fonts of its own — Courier, Times, and Triumvirate™ (similar to Helvetica) — in normal and italic styles, and in a variety of point sizes.

And if you use an HP LaserJet™ Plus or Series II, you'll get extensive support of HP font cartridges, as well as automatic downloading of soft fonts in sizes from 5 to 24 point.

### Print Graphs, Too!

You can include one or more 1-2-3 graphs directly from graph (.PIC) files, right inside your spreadsheet printout.

### What You See Is What You Get!

If you have a graphics monitor, the Allways WYSIWYG display gives you an accurate on-screen picture of just how your printer will look on paper. Whenever you make a formatting change, you'll be able to see its effect instantly.

**FUNK SOFT WARE**
AW 5350 **Allways** 5¼" ..... **$149.00**
AW 5355 **Allways** 3½" ..... **$149.00**
*Requires Lotus 1-2-3 2.0 or 2.01, and 128K.*

# Operate Any Computer, From Anywhere – By Remote Control!

### It's Time to Get Serious About Remote Computing!

CO/SESSION allows you to quickly connect your computer to a distant PC (on a phone line) and run that remote computer as if you were right there — at the keyboard! From a laptop in a hotel room, you can control your PC back at the office — even if it's more powerful -- provide training, or troubleshoot a customer's system from your office.

You can even print documents on either, or both systems simultaneously. And CO/SESSION 4.0 includes an all new *"windows-like"* interface for speed and convenience, plus error-checking, seven advanced new security features, EGA, VGA and Hercules support (for graphics) and much more.

The best package available for *remote computing, remote customer support, background file transfers and remote network access.* Easy to use — just install it — CO/SESSION sits in the background using only **51K.**

And CO/SESSION transfers files up to *20 percent faster* than even its closest competitor — with screen updates over *400 percent faster!*

### Examine the Tremendous Advantages.

CO/SESSION 4.0 runs in the background of both machines until called up by using hot keys. Both the remote (your computer) and host computer (the computer you're calling) can initiate calls using the convenient dialing directory. You'll control the distant PC with speed, safety and convenience.

**Now Available — SESSION/XL for Automatic Operation.**
Now you can transfer files at two o'clock in the morning while you sleep! SESSION/XL is the perfect complement for CO/SESSION, adding a powerful scripting language for automating communications between remote PCs.

**TRITON**
AW 3800 **CO/SESSION (2-user)**
5¼" ..... **$199.95**
AW 3805 **CO/SESSION (2-user)**
3½" ..... **$199.95**
AW 3830 **SESSION/XL** ..... **$175.00**
*IBM PC, XT, AT, PS/2, compatibles; 256K RAM.*

# Quickly Convert Files Between Word Processor Formats!

Now those indispensible word processing files you created six months ago can be easily converted to the format you're running now. WORD FOR WORD is ideal for exchanging files of different formats with business associates, customers, friends — you can even convert files created on your home or laptop computer to the format used in your office.

Convert a 25-page document in less than one minute — 600% faster than the competition!

### Allows Lotus 1-2-3 Conversion INTO Your Word Processor!

WORD FOR WORD allows you to import spreadsheet data into your word processing format! And no other product allows you to perform conversion between "integrated" packages like Enable, Framework and Q&A.

### Converts ALL Attributes!

...contained in the original: margins, tabs, indents, soft and hard carriage returns, boldface, italics, underlines, superscripts/subscripts, newspaper columns, headers, footers, centering, footnote formats, ruler lines, page ends -- and more!

### Convert In Either Direction Between Any of These Formats:

- ASCII
- Displaywrite 3, 4
- Enable 1.1, 2.0, 2.15
- Framework III 1.0, 1.1
- HP AdvanceWrite Plus
- IBM Writing Asst. Plus
- Lotus 1-2-3 1A, 2.0
- Microsoft Word 3.0, 3.1, 4.0, 5.0
- Microsoft RTF
- MultiMate 3.3
- Multimate Advantage I, II
- OfficeWriter 4.0, 5.0, 6.0, 6.1
- PeachText 5000
- pfs: First Choice 1.0, 2.0
- pfs: Write (version C)
- Professional Write 1.0, 2.0, 2.1
- Q&A Write 3.0
- Samna Word IV 1.0, 2.0
- Samna Word IV Plus 1.2, 2.0
- Volkswriter Deluxe 2.2
- Volkswriter 3, 1.0
- Volkswriter 4
- WordPerfect 3.0, 4.1, 4.2, 5.0
- WordStar 3.3, 3.45, 4.0, 5.0, 5.5
- XyWrite III, III Plus

AND MORE!

THE SOFTWARE TOOLWORKS
AW 1320 **Word For Word**
5¼" & 3½" ..... **$99.00**
*IBM PC, XT, AT, compatibles; 256K.*

Circle 259 on reader service card

# A Computerized Atlas!

### More Than Just a Map.

PC Globe and PC USA provide instant information — dazzling maps, graphics, socio-economic and cultural information, time zones, currency exchange rates and much more — on over 177 countries and all 50 United States.

This critically-acclaimed package features fast, easy point-and-shoot operation to put a wealth of visual data at your command.

► **PC Globe 3.0.** Includes world, continent and individual country maps showing city locations and major world organizations. Each map displays elevations, lakes, rivers, mountains and other important geographical features.

The PC Globe database contains population data, age distribution, ethnic and religious groups, health statistics, economic, commodity and trade data, national leaders and political parties, plus tourist attractions and visa requirements. Custom charts can be produced using data, maps and graphics, and exported to desktop publishing or word processor.

► **PC USA.** Spectacular maps of the entire country, all 50 states (and Puerto Rico), as well as information on major cities, including populations, average retail sales, average per capita incomes, economic trends, tax rates, area and zip codes — and more.

PC Globe and PC USA both include keyboard and mouse support, and the ability to save and print screens.

Both are the perfect gift for students, business people, teachers and travelers. Each map is accurate, thorough and brilliantly drawn and colorized.

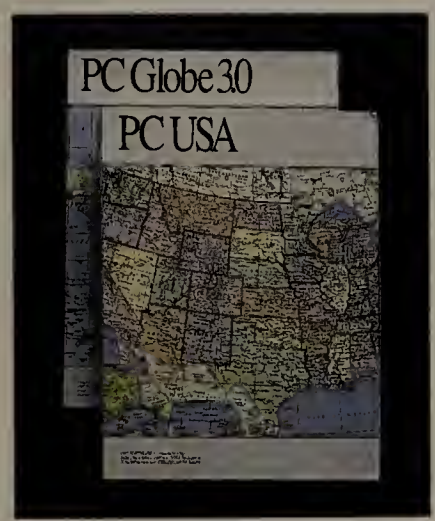
PC Globe

AW 2550 PC Globe 5¼″ ..... $69.95
AW 2555 PC Globe 3½″ ..... $69.95
AW 2750 PC USA 5¼″ ..... $69.95
AW 2755 PC USA 3½″ ..... $69.95

**Order both — save $30!**

AW 2950 PC Globe & USA 5¼″ ..... $109.95
AW 2955 PC Globe & USA 3½″ ..... $109.95

*IBM PC, XT, AT, PS/2, compatibles; 512K & graphics.*




# BE A CREATIVE Problem Solver!

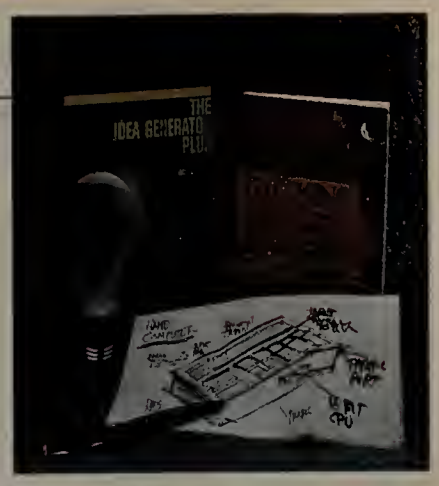
### Unlock the Secrets of Creative Problem-Solving!

This remarkable software package is designed to expand your problem solving abilities — and make no mistake, problem solving is at the very core of success in any endeavour. Managers from AT&T, IBM and Citibank among others, have discovered the secrets of this program's structured problem-solving techniques and are using them to spark fresh, original thinking within their organizations. These amazingly simple techniques help you develop strong business plans, write anything from proposals to screenplays, explore new business opportunities, develop, name and position new products, prepare for meetings, presentations, interviews and audits.

### The Seven Golden Techniques.

Using Idea Generator Plus, you'll explore these seven proven methods of changing perceptions, relating the unrelated, breaking through and exploring new vistas of innovation.

1. **"Similar Situations"** Your past experiences hold sometimes overlooked answers to current problems. Unlock a vast pool of previous knowledge.
2. **"Metaphors for Your Situation"** Analogous situations can provide valuable insight.
3. **"Other Perspectives"** Looking at situations from several different points of view can clarify issues and enhance problem solving.
4. **"Focus on Goals One by One"** Concentrating on one specific goal.




5. **"Reverse Your Goals"** A change in perspective may reveal startling new concepts.
6. **"Focus on the People Involved"** Exploit strengths, avoid weaknesses in yourself and others.
7. **"Make The Most Of Your Ideas"** Simple techniques for holding explosive brainstorming sessions.

### Rip the Roof Off of Your Imagination!

You'll learn to direct your powers of concentration toward a single purpose, to reach imaginative new answers to tough problems.

**FREE** — The book "The Art of Creative Thinking" by Gerard I. Nierenberg

EXPERIENCE IN SOFTWARE, INC.

AW 1200 Idea Generator Plus 5¼″ ..... $195.00
AW 1205 Idea Generator Plus 3½″ ..... $195.00

*IBM PC, XT, AT, PS/2, compatibles; 256K.*

# Lights, Camera, Imagination!

### Create Dazzling Presentations Using Real-Time Animation and Special Effects.

The unforgettable presentation. Every communicator strives for it.

Now there's a tool that combines full color graphics, a console of special effects and real-time animation with fast, professional results.

It's called Dashboard and it puts the unparalleled impact of television into your business communication. You can create unforgettable diskette-based sales presentations (animated or slide show), advertising (including storyboarding and concepting), direct marketing campaigns, industry exhibits, in-store promotions, merchandising and training sessions, animated newsletters, promotional materials, and "electronic art."

Includes dissolving and fading techniques for drama and emphasis, "rubber-banding" cursors for easy shape creation and a toolbox of special effects for both type and graphic images (includes zoom, complete storage/retrieval, text and Presentation Tools).

But there's more! Dashboard can capture images from pixel-based graphics programs (such as font character sets or spreadsheet graphs), or from cameras, TVs and VCRs, then incorporate them into your presentations.

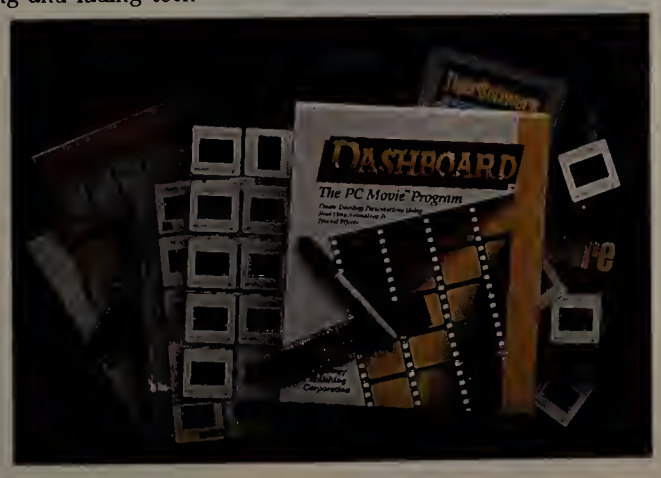
**WIN A SONY VCR AND VIDEO CAMERA**

Enter by sending a postcard to us, or enter automatically when you buy Dashboard. No phone entries, please.

BRIDGEWAY PUBLISHING CORPORATION

AW 1080 Dashboard 5¼″ .... $149.00
AW 1085 Dashboard 3½″ .... $149.00

*IBM PC, XT, AT, PS/2, compatibles; 256K & graphics.*




*Send postcard entries to:* Tiger VCR, 800 SW 37 Ave., Suite 765, Coral Gables, FL 33134. No purchase necessary.

# Professional Formatting for Repetitive Printing Tasks.

### Fast, Practical Label, Report, List and Envelope Printing.

PageGarden is the first laser utility that creates custom formats for any repetitive or standardized print task. PageGarden gives you the ability to add dramatic graphic style to reports, lists, labels, name badges, envelopes, tickets and more without having to spend hours working with your desktop publisher. And PageGarden delivers speed. An HP-LaserJet and PageGarden will blow the doors off the printer drivers included in leading word processors and desktop publishers.

### Mix Custom Graphics, Logos and Effects with Any ASCII Text.

PageGarden creates a format from your design — you simply add ASCII text from your database, spreadsheet, word processor — anywhere! Each time you print a dozen copies of a report, stacks of mailing labels or 300 name badges, they'll all have a custom, professional look. You can easily drop in logos or graphics stored in .PCX format (without going back to their native application), add gray areas, black-on-white type, sequential numbers, boxes with rounded corners, circles and dozens more. Using PageGarden, everything you print achieves a professional, consistent look. PageGarden makes sense for anything you print in bulk quantities — and helps it all look great.

### Use PageGarden with These Applications:

- Databases
- Spreadsheets
- Word processors
- Text editors
- Mail list programs
- Personal organizers
- Accounting systems
- Time billing systems
- Programmer's utilities
- Graphics created with popular paint/illustration programs
- Label programs

**BLOC**Publishing

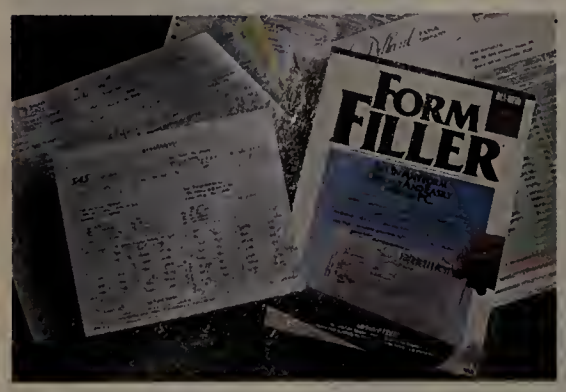
AW 8060 PageGarden 5¼ & 3½ .$99.95

*IBM PC, PS/2, compatibles; 256K. Requires an HP LaserJet Plus, HP LaserJet series II, HP LaserJet IIP, HP LaserJet IID, PostScript or 100% compatible laser printer. No special video adapter is required. Does not support DeskJet.*

Circle 259 on reader service card

# Accurately Fill-In Any Pre-Printed Form.

PC WORLD BEST BUY




### When Only a Pre-Printed Form Will Do...

FormFiller is the only system specifically designed to accurately fill in forms with pinpoint-precision. It contains a host of features that streamline the process—and it can handle any form, including multi-page, double-sided and interleaved carbon forms, while providing over 40 math and financial functions for use within the form.

You'll breeze through invoices, insurance and medical forms, shipping airbills, legal and industrial forms in a fraction of the time you're spending now.

### Here's How FormFiller Works.

FormFiller begins by printing a grid on your pre-printed form. From this grid, FormFiller creates a "master template." To fill in the form, simply call the template, insert the pre-printed form into your printer, and tab from blank to blank—each entry will appear in position. FormFiller then synchronizes your computer and printer for exact positioning anytime you print the form.

There's also a convenient "look-up" table that can store and instantly retrieve frequently repeated information (part numbers, codes, prices, etc.).

### Powerful Import Capabilities and Math Functions.

FormFiller will quickly import/merge/export information from your database or spreadsheet (DIF, dBASE II, III, Lotus 1-2-3, WKS, WK1, ASCII), eliminating time-consuming re-entry of data, without conversion.

FormFiller also has a complete set of math and financial functions that can actually perform calculations, then automatically enter the totals for you.

**BLOC**Publishing

AW 8002 **FormFiller** 5¼″ ..... **$149.00**
AW 8120 **FormFiller** 3½″ ..... **$149.00**
*IBM PC, XT, AT, PS/2, compatibles with 512K, DOS 2.0 or greater and 2 floppy drives, or one floppy drive and a hard disk. Supports virtually all printers. Includes "The FormFiller Sampler"— sample templates, user guide, help cards and spacing grid.*

# "I Like to Keep a Résumé Handy."

### Successfully Manage Your Job Searches and Career Moves.

Here's the most comprehensive résumé software available today. ResumeMaker is simple to use, just fill in the on-screen entry forms with your experience, education and skills and the system automatically assembles your information into a professional, winning résumé. And as your career emphasis changes, just a few keystrokes produces a résumé that reflects your most productive skills and experiences. This package also contains a complete set of letter templates, including cover letters, thank you letters and follow up notes.

You can also use ResumeMaker to create biographic information sheets on company officers, important individuals or for use in press releases.

This package even includes a glossary of important terms used in conjunction with winning résumés. How to make your experiences relevant to the particular job situation you're looking for.

Also included are a target company database, an activities log, and an appointment calendar to help manage and organize your job search.

### Numerous Résumé Formats.

Select a chronological, functional or performance-oriented format to address the precise requirements of your job target. Depending on the type of résumé format you've chosen, various information will be requested and arranged in a logical, flowing manner.

If you want to change the look or content, you can revise the entire résumé in just seconds! Then output your professional results on virtually any printer.

### Guided Letters™ and a Full Word Processor.

Choose from dozens of professionally-written letters. Or, select certain paragraphs and combine them with other letters, for impact and authority. But, if you want to write your own powerful letters, ResumeMaker contains a word processor that lets your ideas flow, with a spell checker and mail merge.

**individual** SOFTWARE INCORPORATED

AW 3950 **ResumeMaker**
5¼″ & 3½″ ..... **$49.95**
*IBM PC, XT, AT, PS/2 or compatibles, Two diskette drives or a hard drive. Supports virtually any printer.*

# Be As Creative As Possible, As Fast As Possible!

### Includes Design Templates, Fonts, Graphic Images — and Speed!

Sit down with the Avagio Publishing System and make magic happen on your pages! It has become the hottest system available on the market today, for creating winning proposals, sharp reports, snappy newsletters, dazzling presentations and data sheets.

### Avagio Publishing System: Macintosh Quality on Your IBM.

Avagio is the premier desktop publishing system that gives you Macintosh-quality documents on your IBM, using new outline font and outline graphic technology. Whether you own a dot matrix, inkjet or laser printer, everything you print will always get razor-sharp, professional results.

### Powerful Design Features.

Everything you need to produce effective newsletters, business reports, brochures, marketing materials, and more is included. Avagio combines quick and easy instruction with features that make sense. Features such as conversion utilities for most PostScript graphic files and HP softfont files; auto text wrap, kerning, leading, group/ungroup, and gradient shading; 150 graphics and 10 design templates. Custom type sizes from 6 to 500 points (7″) in one-point increments give you unlimited creative possibilities.

### Simply Superior Documents.

Avagio's exclusive Mingle™ option lets you control layers of overlapping text and graphics to create spectacular image effects. A WYSIWYG screen completes this powerful program. So you can be as creative as possible, as fast as possible.

### Compatible With Existing Programs.

Avagio is compatible with popular word processing programs and PCX, TIFF, and PIC graphic files.

KYOCERA Unison World

AW 8040 **Avagio** 5¼″ ..... **$299.00**
AW 8045 **Avagio** 3½″ ..... **$299.00**
*IBM PC, XT, AT, compatibles; 256K.*

# The Award-Winning Hard Disk Management Environment.

XTreePro Gold introduces the concept of "intuitive" disk management. This unique approach allows you to do more with less effort. You'll fly through complex tasks like searching through files by contents; opening files along with their applications; copying or moving blocks of text between files; even viewing files in the native formats of applications like dBASE, Lotus 1-2-3, Microsoft Word, WordPerfect and many more.

A leader in disk management for years, XTreePro redefined the concept — XTreePro Gold has swept the industry — becoming the corporate standard.

XTreePro Gold's power is simple to unleash; any operation can be quickly completed with just a mouse click or keystroke. No cryptic commands, or lengthy path names to remember. If you care about your hard disk, let XTreePro Gold bring a new level of competence and sophistication to your computing.

### XTreePro Gold vs. The Competition.

| | XTreePro Gold | Nort. Cmdr. 3.0 | Lotus Magellan | PC Tools |
|---|---|---|---|---|
| Applications menu | • | • | macro | • |
| Auto view | • | | • | |
| Find files | • | | • | • |
| Copy/move file contents | • | | • | |
| View files | • | • | • | • |
| Open/associate appl. | • | • | • | • |
| Split windows | • | • | | • |
| Prune/graft | • | | • | • |
| Global file views | • | | | |
| Collapse directories | • | | | |
| Hide/unhide directories | • | | | |
| Format disks | • | | | • |
| Wipe disks | • | | | |
| Toggle tagged files | • | | | |
| Merge tagged files | • | | | |
| Reverse file specs | • | | | |
| Copy orig. dir. structure | • | | • | |
| Date/time stamp files | • | | | |
| Print directory tree | • | | | |
| Change file attributes | • | • | | • |
| Rename a volume | • | | | • |
| Archive Manager | • | | | |
| Suggested Retail Price | $129 | $149 | $195 | $129 |

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# Picture-Perfect Word Processing

**Thanks to Windows, today's top word processors are helping users reach maximum productivity in no time.**

**Here's why Ami Pro and Word for Windows are your Best Buys right now.**

*George Campbell*

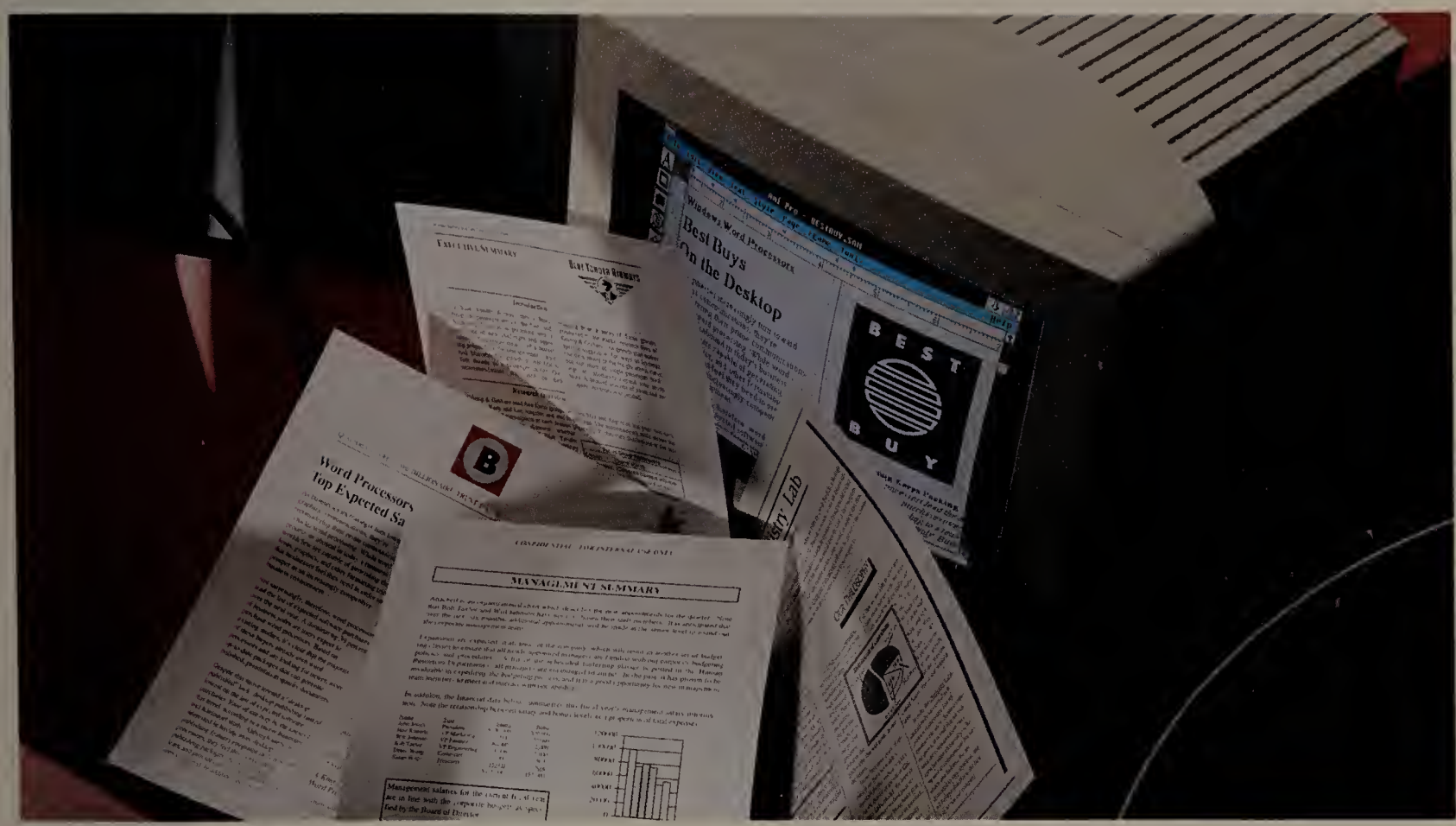
By now the concept of a word processor-cum-desktop publisher is yesterday's news. Every major word processor from *WordPerfect* to *MultiMate* has layered on high-end formatting features such as style sheets, font support, and graphics manipulation. But these character-based programs share one serious flaw: They can't display a realistic replica of the final printed page. Most offer a static page preview that shows columns, fonts, and graphics, but you must exit to the character world to do any work.

Now, thanks to *Windows*' graphical interface, this barrier has fallen. Samna's *Ami Professional*, Microsoft's *Word for Windows*, and, to a lesser extent, NBI's *Legend* offer word processing power that rivals that of *Word* and *WordPerfect*, plus the true-to-life display of a desktop publishing program. They also add enough page layout tools to handle many publishing tasks.

If you're a regular *Windows* user, one of these programs is for you. If you're not yet wedded to *Windows*, one of these packages may make you switch. They're easier to use than high-end character-based word processors, and formatting is somewhat superior. If program standardization and minimal training are your key buying criteria, the uniformity that *Windows* applications like these offer can pay off.

Just remember that *Windows* packages are slow. In National Software Testing Laboratories (NSTL) tests, *Ami Pro* was the speed champ and *Legend* brought up the rear, but none of these programs rivals text-based word processors in speed. To keep your sanity, you'll need at least a 12-MHz 80286 system; an 80386 with a fast hard disk and a minimum of 2MB of RAM is recommended.

On the plus side, the programs' honest page displays eliminate formatting guesswork, and shortcuts such as style sheets, dialog boxes, and icons help you work faster in




the long run. If you rarely use graphics or fancy formatting, stay with your character-based word processor; if precise layout controls are critical, hang on to your desktop publishing program. But for everyone else, why *not* a *Windows* word processor?

### Stylish Word Workers

In many ways, the contenders are three peas in a pod. They all cost $495, include run-time *Windows*, and display the spitting image of printed output, including graphics, fonts, and column formatting. If the slow screen refresh drives you crazy, you can switch to faster, monofont draft modes.

As with all *Windows* programs, you either use a mouse to access pulldown menus or turn to keyboard shortcuts. To format text, you click on paragraphs and select preformatted styles from menus. You can easily create your own styles, and override styles with on-the-fly formatting.

Formatting options are more advanced than in these packages' DOS counterparts, but there's not enough here to satisfy publishing professionals. Except in *Legend*, kerning (changing the spacing between individual letters) and tracking (modifying letterspacing en masse in a block of text) are fairly primitive, and snap-to-grid functions are lacking. None of the programs offers layout controls to match *PageMaker*'s. But their graphics manipulation beats character-based programs hands down. Just open a frame, import the image, and move and resize it.

You won't sacrifice editing tools, either. All the programs offer the basics, from mail merge to footnotes, plus spelling checkers and outliners. They also provide long-document features such as index and table of contents generation.

*Ami Pro* and *Word for Windows* are clearly a step ahead, though, delivering such extras as bookmarks, a thesaurus, network support, and group-writing features. You can

FRED STIMSON

FEATURES EVALUATION

# Word, Ami—Next Best Thing to Desktop Publishing

*Word for Windows is rich in editing features, and Ami Professional is a graphics whiz, but both Best Buys cover the essentials of word processing. Legend lacks too many editing features to compete.*

● Yes
○ No
◒ Deficient

| Editing | Ami Professional 1.1 | Legend 2.0 | Word for Windows 1.0 |
|---|---|---|---|
| Spelling checker | ● | ● | ● |
| Thesaurus | ● | ○ | ● |
| Outliner | ◒[1] | ◒[1] | ● |
| Mail merge | ● | ● | ● |
| Undo | ● | ◒[2] | ● |
| Math functions | ● | ○ | ● |
| Equation editor | ○ | ○ | ● |
| Automatic timed save | ● | ○ | ● |
| Context-sensitive help | ● | ○ | ● |
| Draft mode | ● | ● | ● |
| Maximum number of windows | 1 | 1 | 9 |
| Word processing formats imported | 11[3] | 6[4] | 8[5] |
| Word processing formats exported | 11[3] | 2[6] | 8[5] |
| Long-document features | | | |
| Creates index/table of contents | ● | ● | ● |
| Cross-referencing | ● | ● | ● |
| Bookmarks | ● | ○ | ● |
| Customization tools | | | |
| Macro learn mode | ● | ○ | ● |
| Macro editor | ● | ○ | ● |
| Customize main menus | ○ | ○ | ● |
| DDE links | ●[7] | ○ | ● |
| Group editing | | | |
| Annotations | ● | ○ | ● |
| Redlining | ○ | ○ | ● |
| Document summary | ● | ○ | ● |

[1] Not integrated with text.
[2] Can restore text only.
[3] ASCII, DCA/RFT, Microsoft Word, WordPerfect 4.2–5.0, WordStar, WordStar 2000, PeachText, Samna, Windows Write, MultiMate, AdvanceWrite.
[4] ASCII, DCA/RFT, Microsoft Word, WordPerfect 4.2, WordStar, OASys.
[5] ASCII, DCA/RFT, Word for DOS, Microsoft Works, WordPerfect 4.1–5.0, MultiMate, WordStar 3.3–4.0, Windows Write.

| Formatting | Ami Professional 1.1 | Legend 2.0 | Word for Windows 1.0 |
|---|---|---|---|
| Style sheets | ● | ● | ● |
| Conditional page breaks | ● | ● | ● |
| Widow/orphan control | ● | ● | ● |
| Automatic hyphenation | ● | ● | ● |
| Snaking columns | ● | ● | ● |
| Side-by-side columns | ● | ● | ● |
| Kerning and tracking control | ● | ● | ● |
| Queues documents | ● | ● | ● |
| Prints in background | ● | ● | ● |
| Supports PostScript | ● | ● | ● |
| **Graphics** | | | |
| Graphics formats imported | 6[8] | 7[9] | 10[10] |
| Sizes/crops/rotates graphics | ● | ● | ◒[11] |
| Move graphics frames | ● | ● | ◒[12] |
| Snap-to-grid | ○ | ● | ○ |
| Flows text around graphics | ● | ● | ● |
| Page preview | ● | ● | ● |
| Lines, boxes, borders | ● | ● | ● |
| Drawing program | ● | ● | ○ |
| Charting module | ● | ○ | ○ |
| Table editor | ● | ● | ● |
| Overlays text on graphics | ● | ● | ○ |
| Brightness/contrast controls | ●[13] | ○ | ○ |

[6] ASCII, DCA/RFT.
[7] Receives data only.
[8] TIFF, EPS, Lotus PIC, PCX, Windows Metafile, Windows Clipboard.
[9] TIFF, PCX, HPGL, MacPaint, MS-Paint, Windows Clipboard.
[10] TIFF, CGM, AutoCAD ADI, HPGL, Lotus PIC, Zenographics Mirage, Video Show, Micrografx Draw, Windows Metafile, Windows Clipboard.
[11] No rotation.
[12] Only in print preview mode.
[13] Only on TIFF files.

add hidden notes (annotations) that pop up on request, and track multiple revisions with *Word for Windows'* redlining feature. Powerful macro languages and support for Dynamic Data Exchange (DDE) let programmers customize the programs and exchange data with other *Windows* applications. Less technical users can also record macros, but DDE links usually require programming. A final note: At press time, only *Word for Windows* could run safely under the new *Windows 3.0*. Samna promises a free *3.0*-aware upgrade to *Ami Professional* after *3.0*'s release, and NBI will add *3.0* support in a new version of *Legend* expected later this year.

## Ami Professional 1.1

*Ami Professional* offers more desktop publishing tricks than *Word for Windows*, and it's no slouch at editing, either. Samna's entry lacks Microsoft's redlining, equation editing, and menu customization, but it compensates with drawing and charting. It's also a bit easier to use, especially when you're building tables or manipulating graphics. Factor in *Ami Pro*'s first-place speed, and it's clearly a Best Buy.

*Ami Pro*'s interface is somewhat more flexible than *Word for Windows'*, and the manuals and context-sensitive help are helpful and well designed. A sidebar menu displays icons for common options, such as adding frames and printing. You can select 12 icons from a list of 48 to customize the sidebar according to your whim. Compared to *Word for Windows*, the icons are larger, their layout is less cluttered, and they don't steal from the editing space.

You can choose from five views: a fast draft mode, three graphics modes in various magnifications, and a facing-page preview. *Ami Pro*'s major flaw: You're limited to one document window at a time.

### EXECUTIVE SUMMARY

**Ami Professional 1.1**

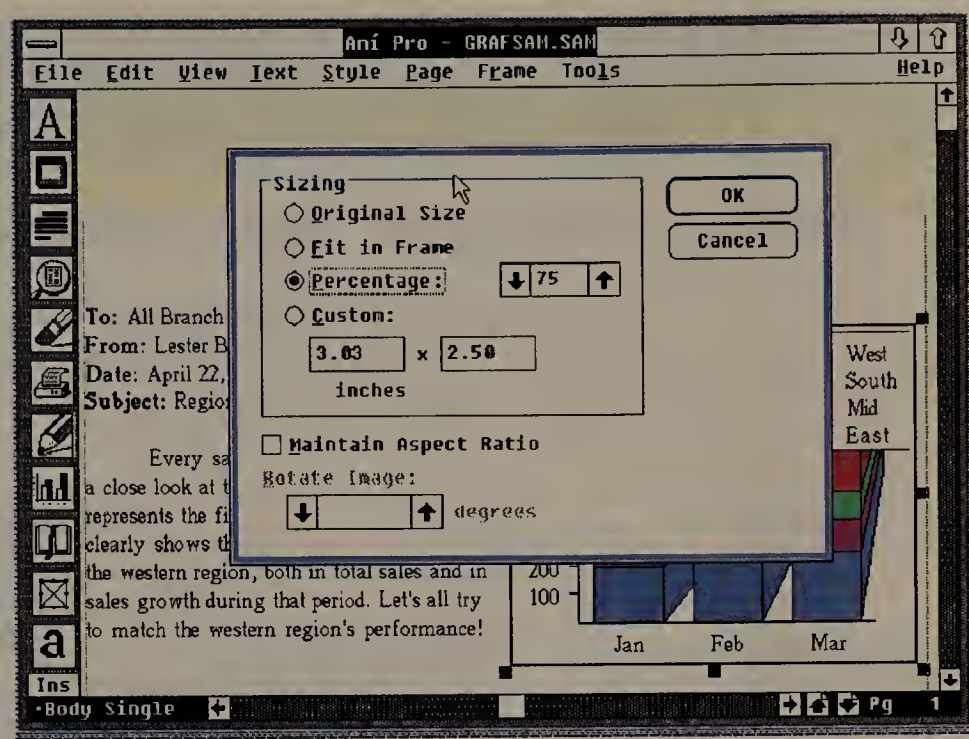
*Word processor*

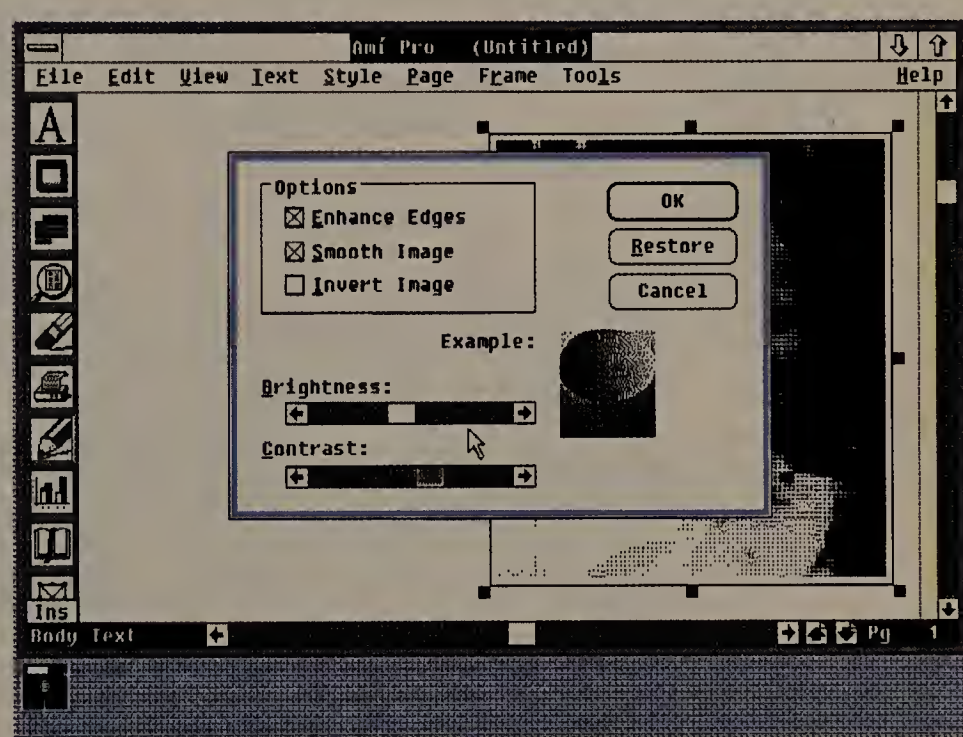
BEST BUY

Striking a near-perfect balance between word processing and desktop publishing, *Ami Professional* is also the fastest program in the roundup. Superb graphics support and a friendly interface add up to a Best Buy.

| | POOR | FAIR | GOOD | EXCELLENT |
|---|---|---|---|---|
| Editing | | | ● | |
| Formatting | | | | ● |
| Graphics | | | | ● |
| Performance | | | ● | |
| Overall value | | | | ● |

**Reader service no. 625**




**Ami Professional is a whiz at graphics, whether you're resizing a graphic (top) or modifying the gray scales of a TIFF image (bottom).**

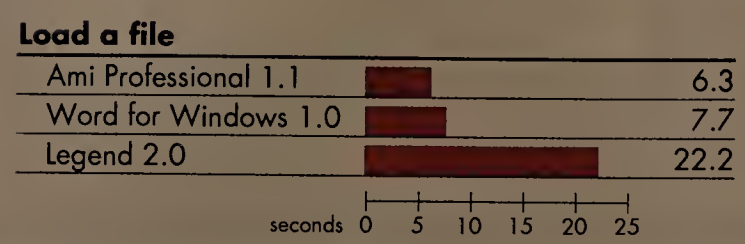
*Ami Pro*'s editing features are strong, but they fall a half-step behind *Word for Windows'* in some areas. The outliner isn't integrated, so you can't rearrange a document by moving the outline headings. The four-level undo command is superior, but mail merge is less capable. Whereas *Word for Windows* can draw upon tabular data, *Ami Pro*'s mail merge requires comma-delimited, fixed-length, or DIF data files.

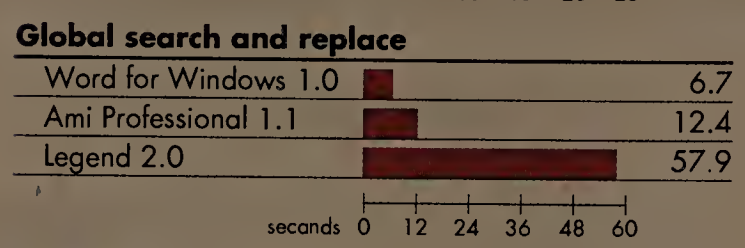
The BASIC-like macro language isn't for novices, but it lets you create complex conditional macros or custom dialog boxes, and it offers extensive on-line help. The program lacks *Word for Windows'* slick debugging tools, however, and you can't customize

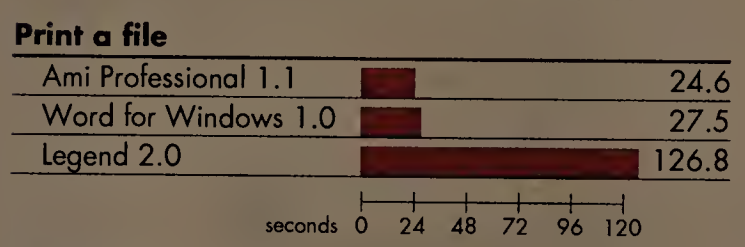
## NSTL TEST REPORT

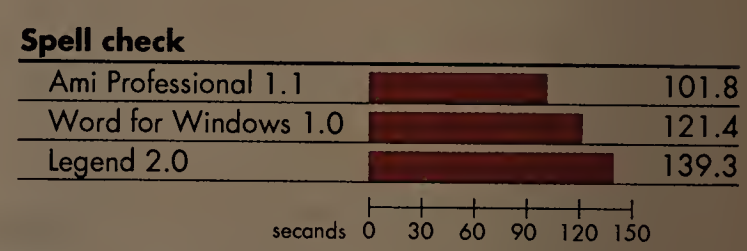
# Editing, Windows Style—Patience Is a Virtue

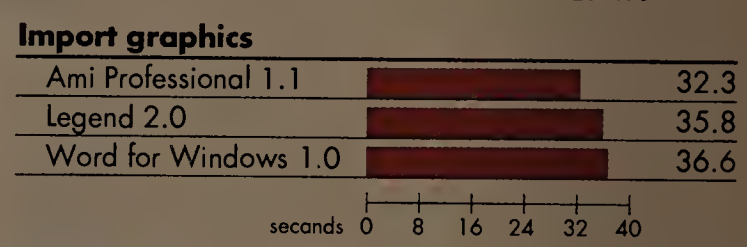
The easy-to-master Windows interface may save users time in the long run, which is why Ami Professional and Word for Windows earn a Best Buy. But if all you need is a lightning-fast text editor, look elsewhere.

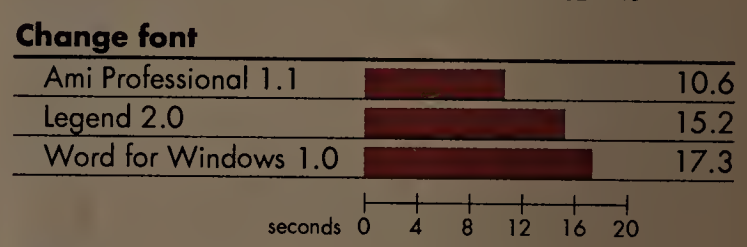



**Methodology**
Tests were conducted on a 12-MHz Compaq Deskpro 286e with 1MB of RAM, DOS 3.31, and a 40MB hard disk. Each package was tested with the run-time version of *Windows/286* provided by the vendor.

**Load a file**
This test measures the time required to load an 11-page document into the text editor in graphics mode.

**Global search and replace**
With the cursor positioned at the beginning of an 11-page document, the program is instructed to automatically replace all 31 instances of a word and to reformat and repaginate the document.

**Print a file**
With the spooler turned on, an 11-page document is printed in Lineprinter 8 font to a Hewlett-Packard LaserJet Series II equipped with 2.5MB of RAM and with no font cartridges installed. The test is timed from the initial command until cursor control is returned to the user.

**Spell check**
This benchmark measures the time a program's spelling checker requires to proof an 11-page document. Before the test is timed, words that the program doesn't recognize are added to the user dictionary to ensure that the program checks the entire document without interruption.

**Import graphics**
With image display not suppressed, a TIFF file is imported an screen into a 3-by-4-inch box. Margins are maintained at 1 inch, and the image is positioned and scaled to fit the frame. Text is selected to flow around the graphic.

**Change font**
With image display not suppressed and the document used for the Import graphics test on screen, text is selected and the Ramon 10 font is changed to Ramon 14. Times include removal of character and format menus from the screen.

**Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.**

menus. *Ami Pro* can receive data from another application via DDE but can't send it.

When it comes to formatting, *Ami Pro* struts its stuff. To apply a style, you just select the text and click on a style from an on-screen list. You can easily create and modify styles and set up document templates with styles and text. One of *Ami*'s best features: When you select a format, an example is shown in a dialog box.

*Ami Pro* also excels at graphics. You can import any of six graphics formats or any of over 100 supplied clip art images. Using the mouse to define frames, you can easily drag, scale, or crop an image, and you can even adjust a TIFF file's brightness or contrast.

More graphics treats await: A drawing program lets you overlay graphics and text on images, and you can choose from a variety of line types. Better yet, you can directly graph data from a table in nine different

styles ranging from pie charts to 3-D axis charts. The easy-to-use, spreadsheetlike table editor even lets you embed cell formulas. Cells expand to hold text, and you can change cell size with the mouse. Importing worksheets requires less tinkering than with *Ami Pro*'s rivals.

*Ami Pro*'s easy-to-use formatting tools are hard to resist. If your documents typically include graphics, it's your Best Buy.

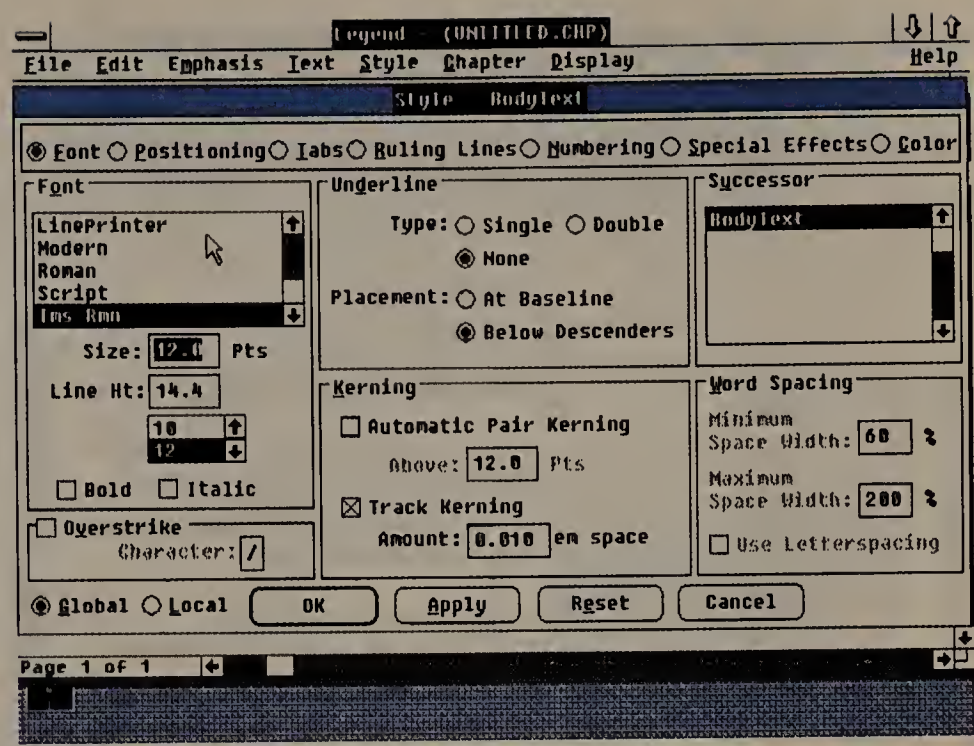
## Legend 2.0

Version 2.0 of NBI's *Legend* is a vast improvement, but it's too little, too late. Geared more toward desktop publishing than word processing, *Legend* excels at some formatting extras. But it lacks key editing features, and it's slow and difficult to use.

Learning *Legend* is a chore. On-line help isn't context sensitive, and the program switches confusingly between two main menus, one for editing and one for framing. No icons are to be found.

Basic text editing is easy, and you can customize the screen to any magnification. You can't split the screen into windows, however, and the draft mode is marred by a status line that flashes at every keystroke. Advanced features are missing—there are no macros, bookmarks, DDE links, or group-editing tools; there's no thesaurus; and the import/export routines are limited.

Like *Ventura Publisher*, *Legend* forces you to create frames for text, including any text that fails to match *Legend*'s default format. Selecting fonts requires two menus, one for type family and another for size. Styles are inextricably linked to the document, so it's all too easy to change styles and save the document, thus overwriting the original style sheet. You can swap styles between documents, but the process is awkward.




**Legend's style-editing dialog box allows one-step control over all aspects of style. Legend's letterspacing controls are superior to the other programs'.**

### EXECUTIVE SUMMARY

**Legend 2.0**
*Word processor*

More desktop publisher than word processor, *Legend* locks the chops to compete in either areno. Slow speed ond on awkward style sheet system moke it a poor volue.

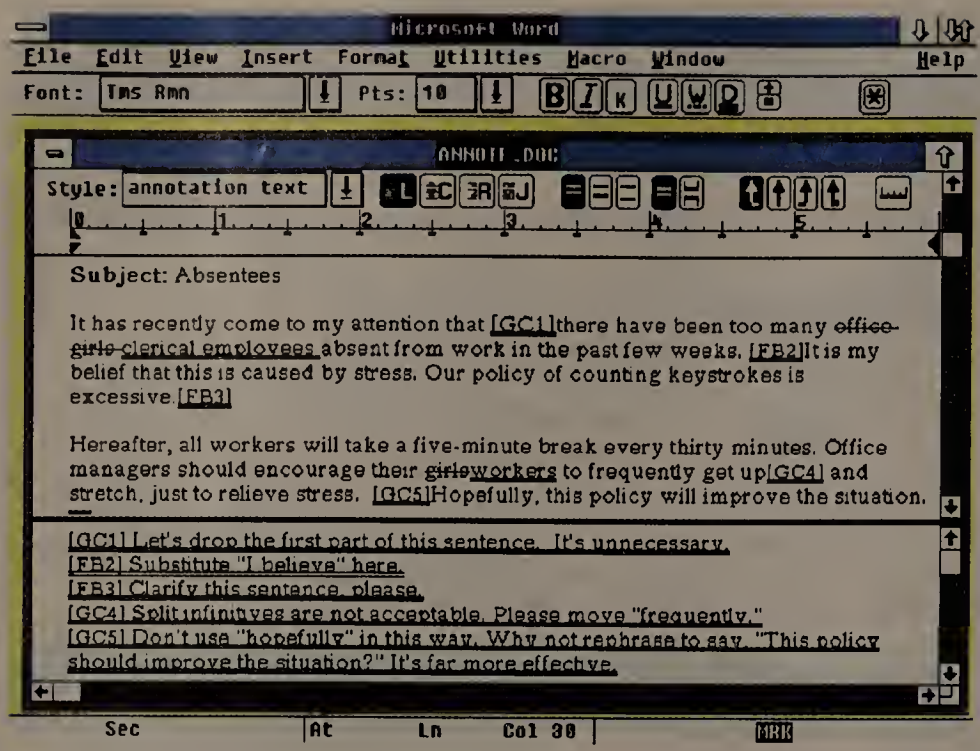
| | POOR | FAIR | GOOD | EXCELLENT |
|---|---|---|---|---|
| Editing | | | ● | |
| Formatting | | | | ● |
| Graphics | | | | ● |
| Performance | ● | | | |
| Overall value | ● | | | |

**Reader service no. 626**

*Legend* is competent at manipulating graphics—you can easily size, crop, and position images and quickly link frames so text flows from frame to frame. There's a handy drawing program but no charting. Tables are a snap to create, but they can't contain graphics, and the lack of math functions limits their usefulness.

### NSTL BENCHMARK TESTING

The exclusive test facility far *PC World*, **National Software Testing Laboratories (NSTL)**, is an independent organizatian that specializes in evoluating personol computer hardware and saftware. A recognized pioneer in state-of-the-art test design, **NSTL** believes that the most useful benchmark tests measure how well products perform when executing typical business tasks. **NSTL** testers follaw detailed test plans that simulate normal aperating conditions. A controlled testing methodology ensures objective, accurate, ond consistent results and gives consumers a sound basis far making purchose decisions. **NSTL** publishes its test results in *Saftware Digest Ratings Report*® and *PC Digest*.™ Neither publication accepts advertising. **NSTL** is located in Philadelphia, Pennsylvania.




**Word for Windows offers superb group editing. The bottom window shows initialed pop-up notes, and above that sits the redlined text marked to show deletions and additions. The upper ribbon and ruler lines provide icons of formatting shortcuts.**

Here and there, *Legend* shines. It offers a handy snap-to-grid feature, which simplifies frame alignment, and its kerning and tracking tools are tops. Unfortunately, *Legend* is stranded in a no-man's-land: Its layout and typographical skills can't match *PageMaker*'s, and its editing skills can't compete with those of *Ami Pro* or *Word for Windows*.

## Word for Windows 1.0

Microsoft's long-awaited *Word for Windows* lacks some of *Ami Pro*'s slick graphics extras, and it's slower and slightly more difficult. But it offers group-editing functions and more advanced editing tools, and its DDE links and macros are also superior. All told, it shares the Best Buy with *Ami Pro*.

The program is fairly easy to learn, thanks to an interactive tutorial and precise manuals. Context-sensitive help is outstanding, but its tiny font makes you squint. Don't expect *Word* experience to help out much in training—users of the DOS-based *Word* will have to learn new hot keys and create new style sheets and macros.

*Word for Windows* lets you open up to nine document windows, but it has fewer view options than its rivals. You can choose a full graphics view, a somewhat faster galley view that won't display graphics, and a fast draft view. There's also a preview mode that displays facing pages, but it lacks magnification options.

In text formatting, *Word* almost matches *Ami Pro*. Optional icon bars, called *ribbons* and *rulers*, sit above the editing screen. The ribbon covers character functions such as fonts and enhancements, and the ruler covers tabs, styles, and margins. If there's more than one function per icon, a menu drops down. The numerous formatting icons make on-the-fly formatting easier than with *Ami Pro*, which reserves its icons for more complex functions. *Word*'s superb, integrated outliner includes its own ribbon.

Style sheets are easier to create and apply than in *Word 5.0* but not as easy as with *Ami Pro*. You create styles via dialog boxes or by using an existing formatted paragraph as an example. Styles are two mouse clicks away instead of *Ami Pro*'s one, however, and dialog boxes don't display format changes.

The table editor is feature rich but harder to use than *Ami Pro*'s—you set cell sizes and borders in a dialog box rather than with a mouse. However, creating multiple-column formats is a snap.

*Word for Windows* can't match *Ami Pro*'s easy interactive graphics manipulation. You don't dump an image into a frame and then

### EXECUTIVE SUMMARY

**Word for Windows 1.0**

*Word processor*

Offering the most powerful editing features in the roundup, *Word for Windows* sacrifices nothing but speed in its transition to *Windows*. A clear Best Buy for the corporate world, its superb group-editing tools and other extras make up for awkward graphics handling.

| | POOR | FAIR | GOOD | EXCELLENT |
|---|---|---|---|---|
| Editing | | | | ● |
| Formatting | | | | ● |
| Graphics | | | ● | |
| Performance | | | ● | |
| Overall value | | | | ● |

**Reader service no. 627**

move it around; instead, you pull a picture into a box, then fill out a dialog box to move and size it. You can't rotate an image or import PCX files, either. You won't find any drawing or charting modules, and border types are limited.

Editing features are top-notch. The mail merge lets you draw upon data from tables. You can even insert special fields and commands that include variables and conditionals, prompt for user input, run macros, or create equations. Group-editing tools, such as redlining and annotations, also shine. The program's superior document summaries let you track revisions and search files.

*Word for Windows'* powerful, BASIC-like macro language isn't for novices, but you can sculpt custom menus and dialog boxes, or add macro commands to menus. And unlike with *Ami Pro*, there's an interactive debugger complete with break points, a step mode, and solid error handling. You'll definitely need the help, because tapping the program's two-way DDE requires macro programming.

Despite its gaps in graphics handling, *Word for Windows* is a winner. Its malleability and editing tools make it the top choice as a corporate word processor.

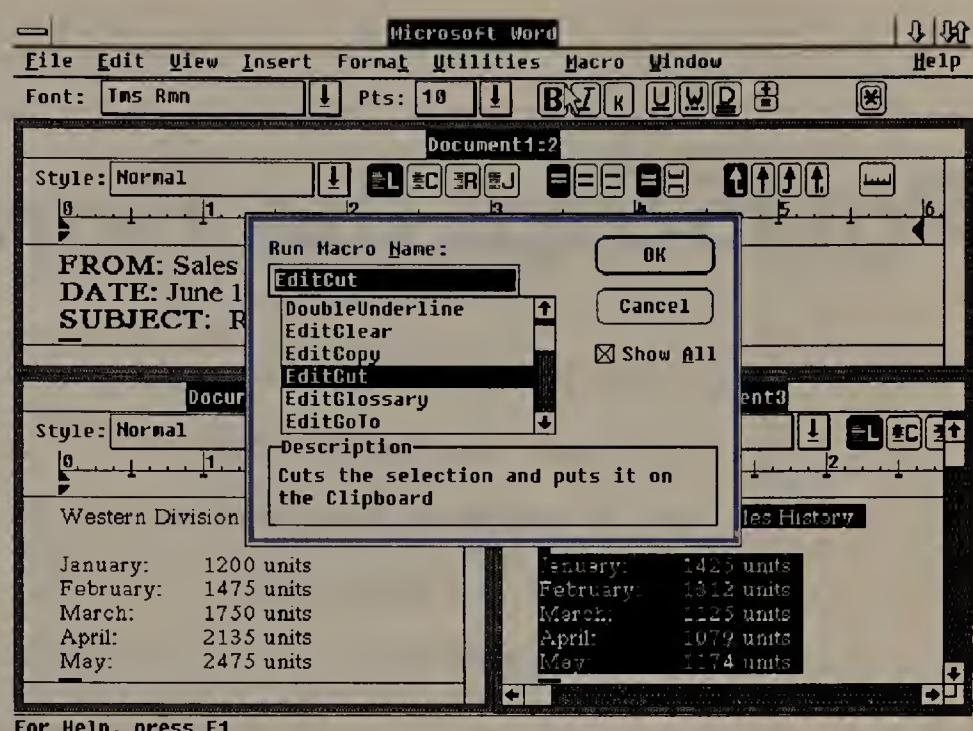
### The Look of the Future

*Windows* now offers the two best word processors in the business. As long as you can afford the high-end systems required to keep them humming, you'll find *Ami Professional* and *Word for Windows* to be a major evolutionary step in the right direction. Choosing between them is the hard part. *Word for Windows* best fits a corporate environment requiring mail merge and group-editing tools. If you need a heavier dose of desktop publishing, *Ami Professional* is the ticket. Both are Best Buys.

Performance is still a problem, but realistic page displays and graphical shortcuts make up for it. Someday you'll probably be using one of these programs or something quite like it, so you might as well jump in now. ●

*George Campbell is a contributing editor for* PC World.

**For more information about all products in this article, circle reader service no. 902.**




**Word for Windows is the only program reviewed that lets you display several files in tiled windows. You can size these windows by dragging the borders with the mouse. Here the user selects a macro to cut and paste text between windows.**

### WHERE TO BUY

**Ami Professional 1.1**
Samna Corp.
5600 Glenridge Dr.
#300
Atlanta, GA 30342
800/831-9679,
404/851-0007
LIST PRICE: $495
REQUIREMENTS: 640K, hard disk, EGA graphics or better, DOS 3.0 or later version, Windows 2.03 or later version
TECHNICAL SUPPORT: unlimited, toll number, M–F 8–7
OTHER SUPPORT: newsletter, BBS
**Reader service no. 625**

**Legend 2.0**
NBI, Inc.
3450 Mitchell Ln.
P.O. Box 9001
Boulder, CO 80301
800/624-1111
LIST PRICE: $495
REQUIREMENTS: 640K, hard disk, EGA graphics ar better, DOS 3.0 or later versian, Windaws 2.03 or later version
TECHNICAL SUPPORT: unlimited, toll-free number, M–F 7–6
OTHER SUPPORT: none
**Reader service no. 626**

**Word for Windows 1.0**
Microsoft Carp.
One Micrasaft Way
Redmond, WA
98052-6399
206/882-8080
LIST PRICE: $495
REQUIREMENTS: 640K, hard disk, EGA graphics ar better, DOS 3.0 or later version, Windows 2.03 or later version
TECHNICAL SUPPORT: unlimited, toll number, M–F 6 a.m.–9 p.m.
OTHER SUPPORT: GEnie and CompuServe farums
**Reader service no. 627**

# PostScript the Hard Way

**These low-cost emulators can turn your plain-vanilla printer into a PostScript clone. But be prepared to wrestle with incompatibilities—and then settle in for a long, long wait.**

*Richard Jantz*

It's hard to resist the allure of PostScript —its scalable fonts and sophisticated graphics capabilities have made it a standard for desktop publishers. And with applications from word processors to spreadsheets supporting it, now virtually anyone can add PostScript pizzazz to his or her documents. But for millions of LaserJet owners, upgrading to PostScript has meant ditching their investment for a PostScript-compatible printer or buying an expensive add-in board.

Now, with the help of PostScript-compatible emulators, you can generate PostScript effects on a variety of laser, ink jet, and even dot matrix printers at a fraction of the cost of, say, an Apple LaserWriter. But can an emulator deliver Adobe PostScript compatibility and convenience at a bargain price?

To find out, we examined five products that promise to bring PostScript to your LaserJet Series II. Custom Applications' *Freedom of Press*, LaserGo's *GoScript Plus*, Pan Overseas' *PreScript Deluxe*, and QMS's *UltraScript PC Plus* are all software emulators, while Pacific Data's PacificPage is a plug-in cartridge. Prices for full, 35-font versions range from $299 to $695, but three of the packages also come in 13- or 25-font versions for less than $200—truly PostScript on the cheap.

We put the emulators through a rigorous series of speed and compatibility tests and found that none merits a Best Buy. While all the products handled simple text documents adeptly, some had problems with common functions like creating fill patterns and curves. On the other hand, a couple of the emulators were able to digest meaty PostScript files even an Apple LaserWriter IINTX couldn't stomach. Of the five, *Freedom* is clearly the compatibility champ.

Other factors also keep a Best Buy at bay. Hidden hardware costs for system and printer RAM can be substantial, some emulators make you exit your application to print a file, and printing can be agonizingly slow. If you need only occasional PostScript output and already have the hardware, consider one of these products. But serious desktop publishers and users starting from scratch should probably invest in a PostScript printer.

### Limits of PostScript Compatibility

Simply put, Adobe's PostScript page description language tells printers how to place text and graphics on a page. PostScript printers interpret these commands and compose each page in their own memory using a high-speed processor; PostScript emulators do the job with your PC's processor and memory, then send a bit map of the page to your non-PostScript printer. (One exception: The PacificPage cartridge does the job at the LaserJet, using the HP controller.)

At a minimum, a PostScript emulator should successfully print PostScript files created with *PageMaker*, *Ventura Publisher*, and other PostScript-compatible applications, and it should be able to produce such effects as reversed, stretched, and rotated type. While all the reviewed emulators meet these criteria, none can interpret all PostScript commands—something that may limit your ability to create complex images.

All the products emulate version 47 of PostScript and provide equivalents to Adobe's library of 35 fonts from Bitstream, Compugraphic, and other top vendors. Except for *PreScript*, all can use third-party downloadable PostScript fonts, but only *Freedom* can handle Adobe fonts—perhaps the truest measure of PostScript compatibility.

### Before You Buy

The two biggest considerations are PostScript compatibility and ease of use. Beyond this, the things that separate a cheap PostScript emulator from a true PostScript printer are speed, cost, and hardware re-

SCOTT BALDWIN

FEATURES EVALUATION

# PostScript on the Cheap: Printer Support Is Key

*Broad printer support and minimal hardware requirements make Freedom of Press the emulator to beat. UltraScript's ease of use and outstanding selection of output options give it second place.*

● Yes
○ No
◒ Deficient

| Standard features | Freedom of Press 2.2 | GoScript Plus 2.2 | PacificPage 2.58 | ProScript Deluxe 1.11 | UltraScript PC Plus 2.0 |
|---|---|---|---|---|---|
| List price | $495 | $299 | $695 | $395 | $445 |
| Printer RAM required[1] | 1MB | 1MB | 2.5MB | 1MB | 1MB |
| System RAM | | | | | |
| Conventional | 640K | 640K | 512K | 640K | 640K |
| Extended | 0 | 0 | 0 | 2MB | 800K[2] |
| Expanded | 512K[2] | 1MB[2] | 0 | 0 | 0 |
| Hard disk space required | 2.5MB | 3MB | 0 | 2.5MB | 4MB |
| Requires 80286 or 80386 | ○ | ○ | ○ | ● | ● |
| Number of fonts[3] | 35 | 35 | 35 | 35 | 47 |
| Supports Adobe fonts | ● | ○ | ○ | ○ | ○ |
| Supports third-party fonts | ● | ● | ● | ○ | ● |
| **Output options** | | | | | |
| Change options within applications | ○ | ○ | ○ | ◒[4] | ● |
| Prints within applications | ◒[4] | ◒[4] | ● | ● | ● |
| Prints multiple files | ● | ● | ○ | ○ | ● |
| Prints multiple copies | ● | ● | ○ | ○ | ● |
| Prints color images | ● | ◒[5] | ○ | ○ | ● |
| Selectable printer resolution | ● | ● | ○ | ○ | ● |
| Selectable paper size | ● | ● | ● | ● | ● |
| Abort printing | ● | ● | ● | ○ | ● |
| Automatically switches between PCL and PostScript | ● | ● | ○ | ○ | ● |

| Status displays | Freedom of Press 2.2 | GoScript Plus 2.2 | PacificPage 2.58 | ProScript Deluxe 1.11 | UltraScript PC Plus 2.0 |
|---|---|---|---|---|---|
| Percentage of file processed | ● | ● | ○ | ○ | ● |
| PostScript error messages | ● | ● | ○ | ● | ● |
| Printer problems | ● | ● | ● | ● | ● |
| **Supported printers/peripherals** | | | | | |
| LaserJet Series II | ● | ● | ● | ● | ● |
| LaserJet Series IID | ● | ● | ○ | ● | ○ |
| LaserJet Series IIP | ● | ● | ○ | ● | ● |
| LaserJet Plus | ○ | ● | ○ | ○ | ○ |
| PaintJet | ● | ● | ○ | ○ | ● |
| DeskJet | ● | ● | ○ | ● | ● |
| Other ink jets | ● | ● | ○ | ○ | ● |
| Epson dot matrix LQ/FX | ◒[6] | ● | ○ | ○ | ● |
| IBM Proprinter | ● | ● | ○ | ○ | ● |
| Film recorders | ● | ○ | ○ | ○ | ○ |
| Intel Visual Edge | ● | ● | ○ | ○ | ○ |

[1] Minimum required for full-page 300-dpi images.
[2] Minimum recommended.
[3] The 35 standard PostScript fonts are AvantGarde, Bookman, Courier, Helvetica, New Century, Palatino, Symbol, Times, Zapf Chancery, and Zapf Dingbats, in a variety of bold, light, oblique, or italic faces. UltraScript adds a family of 12 Lucida fonts for a total of 47.
[4] Only under Windows.
[6] Single color only.
[7] LQ only.

quirements. Unfortunately, no single product excels in every category.

And while these emulators will work on a LAN, they're far from ideal. No vendor guarantees compatibility with all network printer drivers or certifies its product for use on a server. The PacificPage cartridge is an economically attractive solution for networked LaserJets, since you need only one unit per printer. But the cartridge doesn't automatically switch back to the HP's PCL mode, a shortcoming that may cause non-PostScript documents queued up behind yours to vanish into oblivion. LAN users should approach these emulators with caution.

**Compatibility** We tested each emulator—and an Apple LaserWriter IINTX—using documents created with *Adobe Illustrator*, *Corel Draw*, *Microsoft Word*, *PageMaker*, and *Ventura Publisher*, then fed them ten "torture" files designed to tap PostScript's robust graphics commands. All the products handled simple text documents with ease, but tests with complex graphics occasionally produced imperfect curves, jagged lines, or incomplete images. Only *Freedom* printed all the torture files—something even the LaserWriter couldn't do. The other emulators

choked on one or more of the tests (see the sidebar "PostScript Clones Survive the Compatibility Torture Test").

**Configuration and Use** Installing the PacificPage cartridge is easy: Just plug it in. The rest of the emulators require you to copy files to disk and select printer, port, paper size, and other settings as prompted. To change settings in *Freedom* or *GoScript*, you have to rerun the setup program. Only *PreScript* (running under *Windows/286*) and *UltraScript* let you reconfigure on the fly from handy pulldown menus.

Printing can be a bigger pain. With *Freedom* and *GoScript*, you must print files to disk, exit your application, and then send the files to the printer from DOS. But *UltraScript*, *PreScript*, and PacificPage work transparently: Simply install your programs for a PostScript device and print.

**Speed** If you want quick PostScript output, look elsewhere. Even the fastest emulator, PacificPage, is two to ten times slower than an Apple LaserWriter IINTX. Worse, because most emulators use the PC to process PostScript code, your system is frozen until the composed image is sent to the printer. PacificPage frees up your PC relatively quickly, but you'll still have to wait until your application finishes downloading the file to the printer.

**Hidden Hardware Costs** Although three of the products work with an 8088-based PC, for even reasonable performance you'll need a fast 286 or 386 with at least 1MB of extended memory, several megabytes of hard disk space, plus 1MB to 2.5MB of printer RAM. A math coprocessor is also recommended for processing graphics files with *Freedom* or *GoScript*. Unless you already own most of this equipment, these low-cost emulators may not be much of a bargain (see the sidebar "Solving the PostScript Equation—The True Cost of Emulators").

**Printer Support** Obviously, all the products work with the Series II—and that's the end of the story for PacificPage. (Pacific Data also sells a $449 cartridge for the IIP.) *PreScript*'s meager printer list includes only PCL-compatible lasers and the DeskJet Plus. The other three all support dot matrix and ink jet printers, but only *UltraScript* and *Freedom* support full color output—and *Freedom* adds support for thermal transfer printers and film recorders.

## Freedom of Press 2.2

At $495, Custom Applications' *Freedom of Press* is relatively expensive, but it's also the most versatile and polished performer in the roundup. It will run on an 8088 PC with 640K, supports the widest range of output devices, and offers top PostScript compatibility. If you could just load it and print from inside applications, *Freedom* would easily rate a Best Buy. Still, business users and occasional desktop publishers should find *Freedom* a worthy choice.

What really distinguishes *Freedom* is its superior accuracy in interpreting PostScript commands. It proved almost flawless in compatibility tests, printing several files the LaserWriter couldn't handle but stumbling over a complicated mandala image. And it's the only product that lets you use downloadable Adobe Type 1 fonts—a clear indication of PostScript compatibility.

*Freedom* tied for second with *UltraScript* in speed tests, thanks to the test system's math coprocessor, which made printing graphics-intensive documents two to three times faster. To squeeze more speed from your LaserJet, Custom Applications also

Even the fastest emulator is two to ten times slower than an Apple LaserWriter IINTX.

### EXECUTIVE SUMMARY

**Freedom of Press 2.2**

*PostScript-language emulator*

If Freedom of Press let you print from within applications, it would rate a Best Buy. Still, top-notch PostScript compatibility, flexible hardware requirements, and generous printer support make this $495 program a solid value.

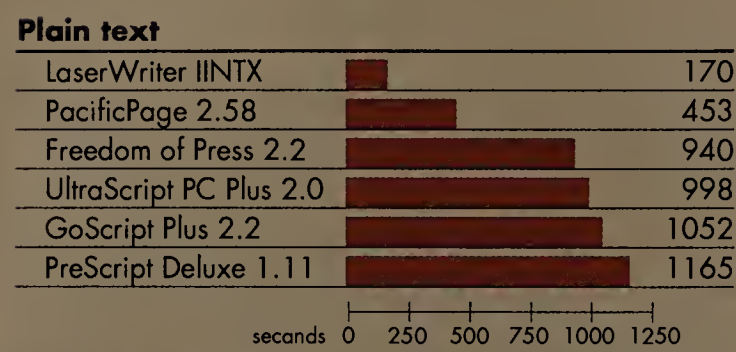
| | POOR | FAIR | GOOD | EXCELLENT |
|---|---|---|---|---|
| Standard features | | | | ● |
| Output options | | | ● | |
| PostScript compatibility | | | | ● |
| Speed | | ● | | |
| Overall value | | | ● | |

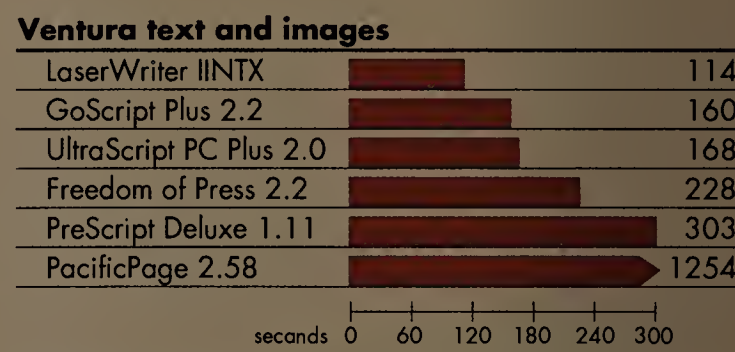
**Reader service no. 645**

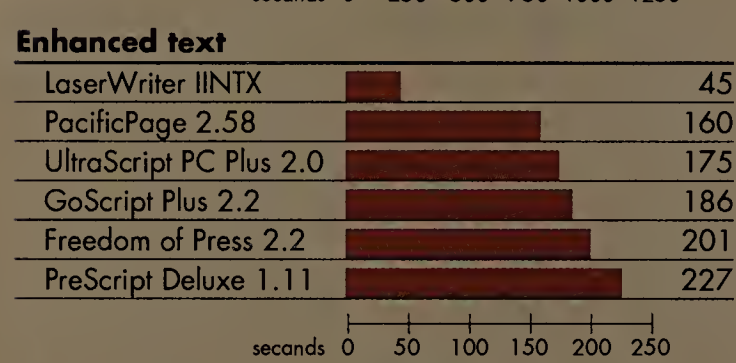
NSTL TEST REPORT

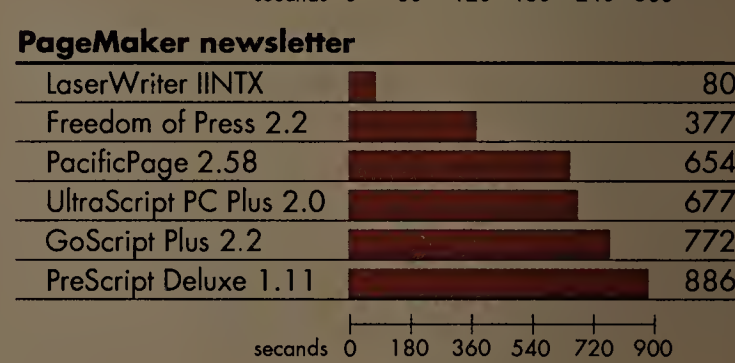
## PostScript Emulators: Output Worth Waiting For?

None of these emulators is a speed demon, but some are faster, simpler, and more compatible in certain situations. If you just need PostScript fonts, pick the PacificPage. For graphics, Freedom of Press and UltraScript PC Plus are the clear choices.




**Methodology**
PastScript emulatar tests were canducted an a 20-MHz Campaq 386 with 5MB af RAM, a caprocessar, DOS 3.31, and a 60MB hard disk. A Hewlett-Packard Laser Jet Series II with 4.5MB af RAM installed was used as the printer far the PastScript emulatars. Ta eliminate an applicatian's effect an printing time, all autput was captured ta a RAM disk and then capied ta the printer. Timing began when the cammand ta capy was issued and ended when the last page came ta rest in the autput tray. Pracessing times were included far all praducts. Campaq's expanded memary manager (CEMM.EXE) was set far 3.5MB in tests af Freedam af Press 2.2 and GaScript Plus 2.2. GaScript Plus 2.2 was tested using its virtual memary setting. PreScript Deluxe 1.11 and UltraScript PC Plus 2.0 were allacated 2.5MB and 3.5MB, respectively, af extended memary during installatian.

**Plain text**
Plain text printing is tested using a 21-page dacument written entirely in Caurier 10 with na enhancements (such as baldface ar underlining) and generated in partrait made with the WardPerfect Apple driver.

**Enhanced text**
Enhanced text printing is tested using a 4-page text dacument written entirely in Caurier 10 but cantaining superscripts, subscripts, baldface, underlining, italics, and sa farth and generated in partrait made with the WardPerfect Apple driver.

**Ventura text and images**
Camplex text and images printing is tested using a 1-page Ventura 2.0 dacument that includes variaus sizes af Helvetica, a small scanned image, same line drawings, and a bar chart.

**PageMaker newsletter**
Newsletter text and graphics printing is tested using an 8-page PageMaker 3.0 newsletter that includes variaus sizes af Helvetica and harizantal bar charts.

**Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.**

sells Freedom Fast, a $150 accelerator cartridge that plugs into a Series II font slot. For maximum performance, 512K or more of expanded memory in your PC is recommended.

Although *Freedom* forces you to copy print files to the printer, supplied batch files for popular programs like *Ventura* and *Microsoft Word* will do the job for you and then delete the files. A bar graph displays *Freedom*'s progress as it interprets the PostScript commands. Reconfiguring the program is a snap: A batch file prompts you for new printer, port, and other settings.

Custom Applications claims the next version of *Freedom* will let you print from within applications. But even now, *Freedom*'s reasonable hardware requirements, broad printer support, and excellent compatibility make it a solid value.

## GoScript Plus 2.2

LaserGo's $299 *GoScript Plus* is the cheapest emulator in the roundup. Like *Freedom*, it supports ink jet and dot matrix printers and can run on a 640K PC (though at least 1MB of expanded memory is recommended). But *GoScript* is slow, can't print within applications, and isn't as reliable as *Freedom* at translating PostScript graphics commands. If images play a major role in your documents, stay with *Freedom*.

*GoScript*'s PostScript compatibility is limited. While the program has no problem producing text, it doesn't support PostScript's Setscreen command, which customizes the shape, frequency, and angle of halftone cells. As a result, *GoScript* balked at printing complex halftone patterns, and it rendered bitmapped graphics slightly darker than other programs, causing a subtle loss of detail. On the other hand, it printed some sophisticated wave patterns the LaserWriter couldn't handle.

*GoScript* is no speed demon, finishing fourth overall in our tests. And this sluggish performance doesn't come cheap: A math coprocessor, 1MB of expanded memory, and 3MB of hard disk space are recommended, along with 1MB or more of printer RAM.

Like *Freedom*, *GoScript* forces you to print files to disk, then operate from the DOS prompt. Printing multiple copies or changing printer settings means typing a string of DOS switches. And while *GoScript* offers pop-up menus for easy configuration, you'll have to define parameters like virtual

**EXECUTIVE SUMMARY**

**GoScript Plus 2.2**

*PostScript-language emulator*

GoScript's $299 bargain price and broad printer support are offset by slow performance, a difficult interface, and limited PostScript compatibility.

| | POOR | FAIR | GOOD | EXCELLENT |
|---|---|---|---|---|
| Standard features | | | ● | |
| Output options | | | ● | |
| PostScript compatibility | | ● | | |
| Speed | | ● | | |
| Overall value | | ● | | |

**Reader service no. 646**

## POSTSCRIPT CLONES SURVIVE THE COMPATIBILITY TORTURE TEST

*Daniel Tynan*

**Just how compatible are these PostScript emulators? To find out, we strapped the products to the rack and force-fed them a series of PostScript-language torture files. Then we took the same files and attempted to print them on an Apple LaserWriter IINTX.**

**The files were designed by Ross Smith, a desktop publishing consultant and the author of *Learning PostScript: A Visual Approach* (Peachpit Press, Berkeley, California, 1990). Each pushed the emulators to the limit, testing their ability to handle PostScript commands used to create complex curves, halftones, gray-scale images, layered text and graphics, and other sophisticated effects.**

**Overall, the PostScript emulators did reasonably well—and in several cases they printed complex images the LaserWriter couldn't handle—but some failed at basic tasks like creating pattern fills and smooth curves (see sample output on the following pages). Of the five emulators, only *Freedom of Press* was able to print all ten files—with one notable gaffe—without crying uncle. The rest all failed to print at least one of the tests, which means if you want to print elaborate designs created with programs like *Corel Draw*, *Adobe Illustrator*, or *PC Paintbrush IV Plus*, you may run into problems.**

**As these torture tests show, not all PostScript interpreters are created equal. If you only need to produce simple text and graphics, any of these emulators should do fine. But if you want to get fancy, not even the granddaddy of PostScript devices, the Apple LaserWriter, can guarantee success.**

***Daniel Tynan** is an assistant editor for* PC World.

Freedom of Press

PacificPage

In this test, PacificPage (right) successfully printed text characters against a dark background, but it couldn't duplicate the smooth curves produced by Freedom of Press.

memory size, then reconfigure them if *GoScript* runs out of memory while interpreting a file. In fact, if you don't have enough conventional memory available (about 550K), you may encounter files that *GoScript* can't handle.

*GoScript* is easily the most affordable way to get PostScript—a 13-font version sells for only $149. And at press time, LaserGo announced *GoScript 3.0*, which includes a menu-driven interface and a VGA preview mode. But until the program's PostScript compatibility and performance improve, wait and see.

## PacificPage 2.58

Pacific Data Products' $695 PacificPage stands apart from other emulators for several reasons. It's the only plug-in PostScript cartridge reviewed, it requires the most printer RAM (2.5MB), and it works only with the LaserJet Series II. But it's also the easiest emulator to install, you can print from within applications, and it doesn't care if you use a dual-floppy PC or a 33-MHz 386. For offices that share a Series II, PacificPage is the most economical choice.

PacificPage's PostScript compatibility is good but not outstanding. Like *GoScript Plus*, PacificPage consistently produced high-quality text, but it had trouble interpreting some PostScript graphics commands, resulting in ragged curves and imperfect circles. Still, you're not likely to encounter these problems printing everyday documents.

As the overall speed champ, PacificPage was twice as fast as its nearest challenger at plain text but was woefully slow at printing a complex *Ventura* file. But because PacificPage composes pages in the printer, it returns your PC to work more quickly than the other emulators, making it seem even faster. And PacificPage doesn't require a math coprocessor or a lot of system RAM—good news for users on a tight budget.

Installing PacificPage couldn't be simpler: Just slide it into the Series II's font cartridge slot. Then install your applications for a PostScript printer and print. To return to PCL mode, simply run a batch file or turn off the printer and yank out the cartridge. Just remember that if you use PacificPage on a

## SOLVING THE POSTSCRIPT EQUATION—THE TRUE COST OF EMULATORS

*Daniel Tynan*

**How cheap is a low-cost PostScript emulator? When you factor in costs for system and printer RAM, plus performance extras like a math coprocessor, it's still cheaper than a PostScript printer—but not by much. We compared the roundup's top program, *Freedom of Press*, with an add-on board for the HP LaserJet Series II and with Texas Instruments' inexpensive MicroLaser PS35, both Adobe-licensed PostScript devices. As the table shows, *Freedom of Press* is two-thirds the price of the TI printer, but only about $150 cheaper than the upgrade kit. Of course, if you can live without the extra hardware—or already own it—the cost savings increase dramatically.**

| | Freedom of Press | HP JetScript Accessory Kit | Texas Instruments MicroLaser PS35 |
|---|---|---|---|
| List price[1] | $ 495 | $2195 | $2999 |
| 1MB printer RAM | 495 | included[2] | included[3] |
| Intel AboveBoard Plus with 512K expanded RAM | 695 | n/a | n/a |
| 80287-10 coprocessor[4] | 374 | n/a | n/a |
| Total | $2059 | $2195 | $2999 |

[1] List prices as of March 7, 1990.
[2] 3MB standard.
[3] 1.5MB standard.
[4] Optional; while Freedom of Press will run in a 640K PC without an 80287, expanded memory and a coprocessor are recommended.

Freedom of Press

GoScript

PreScript

networked LaserJet, switching modes while someone else is printing can garble their output.

PacificPage is a solid deal, and it's the only emulator reviewed that lets you put the emulation where it belongs—in the printer. But if you need PostScript output on anything other than a LaserJet II—or if you tackle complex graphics—look elsewhere.

**EXECUTIVE SUMMARY**

**PacificPage 2.58**

*PostScript-language emulator*

The easiest emulotor ta instoll and use, the $695 PacificPage combines fost perfarmance with gaod PostScript campatibility. But it warks only an o LaserJet Series II with at leost 2.5MB of RAM. A smart buy far o printer-sharing affice.

| | POOR | FAIR | GOOD | EXCELLENT |
|---|---|---|---|---|
| Standard features | | | ● | |
| Output options | | | ● | |
| PostScript compatibility | | | ● | |
| Speed | | | ● | |
| Overall value | | | ● | |

**Reader service no. 647**

## PreScript Deluxe 1.11

As the newest kid on the PostScript block, Pan Overseas' $395 *PreScript Deluxe* is promising but awkward. Though fairly inexpensive (a 13-font version sells for $195), it's the only program that won't accept any downloadable PostScript fonts, and it works only with PCL-compatible printers. Worse, it combines stiff hardware requirements with mediocre compatibility. The only plus: You can print from within *Windows/286* or DOS applications.

*PreScript*'s PostScript compatibility is spotty. The program did fine on most everyday applications and survived some of the toughest torture tests. But it glitched on several others, producing jagged curves, dark bit maps and tints, and incomplete images.

In speed tests, *PreScript* finished dead last three out of four times. However, informal tests indicated that *PreScript* is second

**EXECUTIVE SUMMARY**

**PreScript Deluxe 1.11**

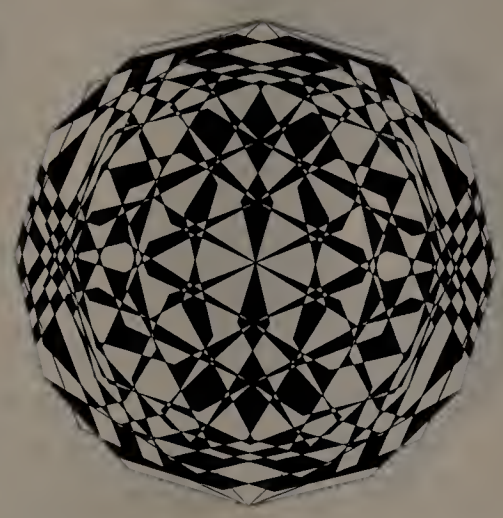
*PostScript-language emulator*

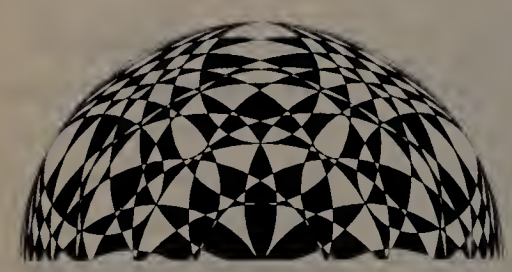
Thaugh the $395 *PreScript* lets you print from within opplicotians, its poar performonce, huge hordware oppetite, and spatty campotibility keep it fram being a seriaus contender.

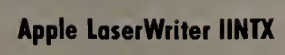
| | POOR | FAIR | GOOD | EXCELLENT |
|---|---|---|---|---|
| Standard features | | | ● | |
| Output options | | | ● | |
| PostScript compatibility | | | ● | |
| Speed | | ● | | |
| Overall value | | | ● | |

**Reader service no. 648**

**While Freedom of Press (far left) easily printed the correct halftone pattern, GoScript's lack of support for PostScript's Setscreen command caused it to print the image as a shaded gray box. Still, that's better than PreScript, which failed to print any pattern at all.**




**The mandala test provided the greatest challenge to the emulators. UltraScript produced octagonal patterns instead of circles; Freedom of Press printed a different pattern entirely; and PreScript printed half of the mandala perfectly, then threw up its hands in defeat. But the Apple LaserWriter IINTX, which was unable to handle the image's large number of line segments, produced nothing but an error message.**

only to *UltraScript* when printing inside applications. Still, you'll have to pay a hefty hardware price: The program requires an 80286 or better with at least 2MB of extended memory, plus 1MB of printer RAM.

*PreScript* loads directly into extended memory above 1MB and runs in the 80286's protected mode. As a result, it can address up to 16MB of memory—great for processing huge files—and print in the background under *Windows/286* (but not *Windows/386).*

Using *PreScript* is a breeze: Load it, then run your application and print. To switch back to PCL mode or change settings under *Windows*, you select options from a menu; with DOS applications, you must exit and run an included utility. However, *PreScript* won't print some documents unless you issue a <Ctrl>-D command to flush the printer's output buffer.

If Pan Overseas improves the program's PostScript compatibility and resolves its other complications, *PreScript* could be a contender. Until then, *UltraScript* offers an easier and more reliable option for printing within applications.

## UltraScript PC Plus 2.0

QMS's $445 *UltraScript PC Plus* comes closest to blending the convenience of PacificPage with the compatibility of *Freedom.* It works transparently within applications, can be configured from pulldown menus, and comes with 47 fonts. (A 25-font version sells for $195.) But *UltraScript* requires a 286 with extended memory for printing inside applications, and its printer support and compatibility don't quite match *Freedom*'s.

*UltraScript* is fairly fluent at interpreting PostScript. In application tests, the program was equal to *Freedom*, handling everyday documents with aplomb. But it failed to print two of the more ornery torture tests and printed a slightly flawed version of the mandala.

In speed tests with a math coprocessor installed, *UltraScript* tied for second with *Freedom.* In tests run without the coprocessor, however, *UltraScript* proved far faster than its rival in printing complex pages. And from inside applications, *UltraScript*'s printing speed is tops, but you'll need at least

### EXECUTIVE SUMMARY

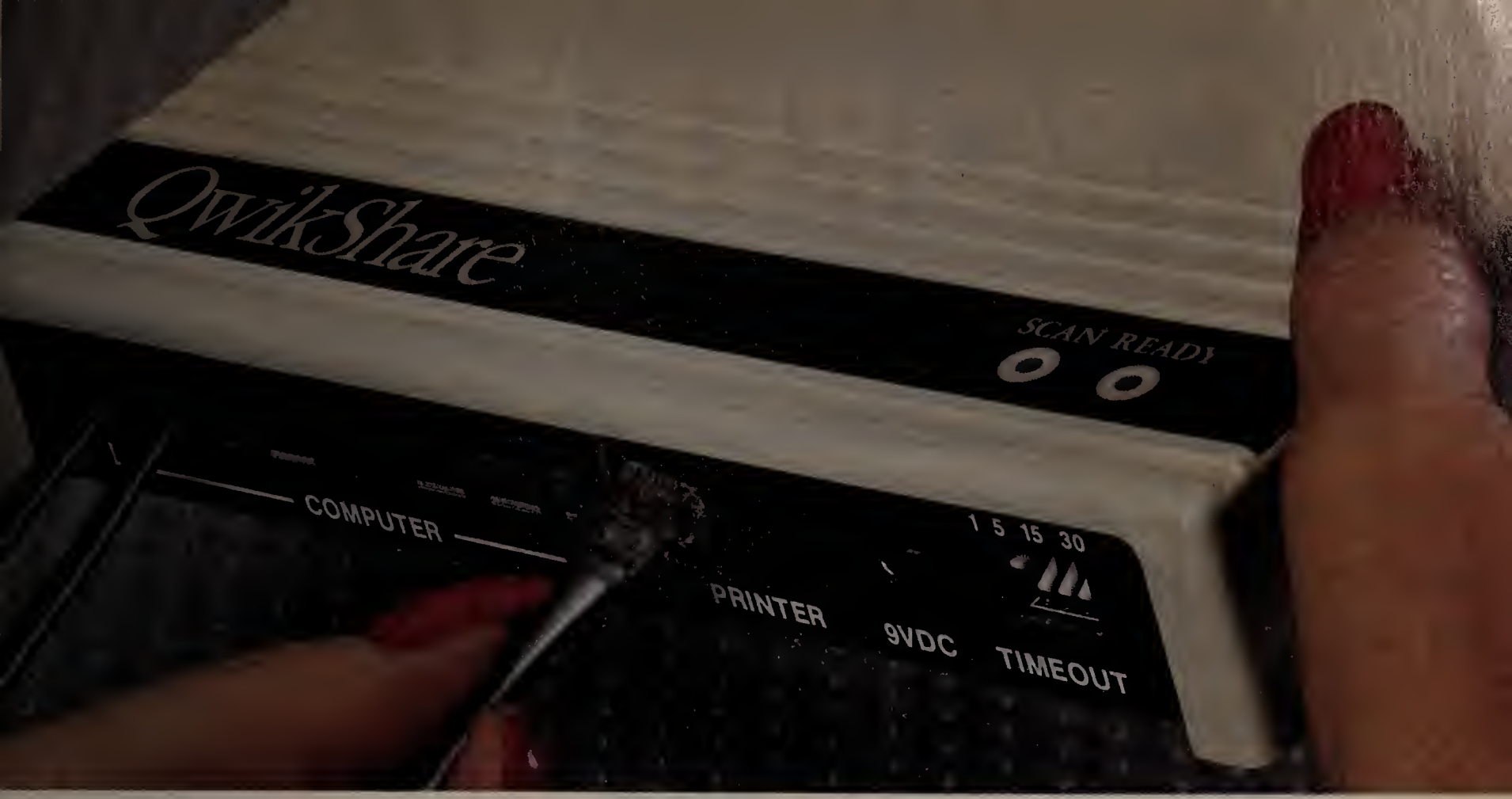
**UltraScript PC Plus 2.0**

*PostScript-language emulator*

*UltraScript* combines respectable speed and solid PostScript compatibility with transparent printing inside applications and the easiest configuration of the bunch. With a better compatibility rating, this $445 package would have earned a Best Buy.

| | POOR | FAIR | GOOD | EXCELLENT |
|---|---|---|---|---|
| Standard features | | | ● | |
| Output options | | | | ● |
| PostScript compatibility | | | ● | |
| Speed | | ● | | |
| Overall value | | | ● | |

**Reader service no. 649**

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800K of extended memory; you'll also need 4MB of hard disk space and 1MB of printer RAM.

Like *PreScript*, *UltraScript* can work inside applications, print in the background, and run under *Windows/286* but not *Windows/386*. But *UltraScript* also works well as a stand-alone program. From pulldown menus you can choose printers, resolution, and paper size on the fly, and scroll through subdirectories to locate the file you want to print. LAN users take note: To use *UltraScript* on networks like NetWare 286, you need to configure it for a DOS printer port —a fact not laid out in QMS's manual.

*UltraScript* is the only emulator besides *Freedom* that supports full-color output on ink jet and dot matrix printers. Version 2.1, announced at press time, adds support for even more printers and resolution-enhancement boards.

*UltraScript* is a flexible and easy-to-use program with solid PostScript credentials, but that's not enough to beat *Freedom*'s superior compatibility and slimmer hardware requirements. But if you use a 286 and prefer the convenience of transparent printing, *UltraScript* is a smart buy.

**Final PostScript**

Users who want PostScript mainly for its text-handling finesse should find any of these emulators acceptable. Beyond that, the differences are graphic. If you're sharing a LaserJet Series II and money's tight, the PacificPage cartridge is good news. Otherwise, the class acts are *Freedom of Press* and *UltraScript*, which provide reliable PostScript output to the widest range of printers. While *UltraScript* takes the prize for ease of use, *Freedom*'s superior compatibility rating and lower hardware costs give it a slight edge.

Still, these emulators' sluggish performance makes them suitable for only occasional use. If you require a daily diet of high-quality PostScript output, go with a PostScript printer. Otherwise, some of these products provide solid deals; next time around, they may even earn Best Buys. ●

*Contributing Editor Richard Jantz is the author of* Advanced Ventura: Desktop Publishing for Professionals *(John Wiley & Sons, New York, 1990).*

**For more information about all products mentioned in this article, circle reader service no. 905.**

**WHERE TO BUY**

**Freedom of Press 2.2**
Custom Applications Inc.
900 Technology Park Dr., Bldg. 8
Billerica, MA 01821
800/873-4367
LIST PRICE: $495, Freedom Fast speedup cartridge $150
REQUIREMENTS: 640K, hard disk, DOS 2.1 or later version, 1MB RAM for laser printers; 512K or more expanded memory and math coprocessor recommended
TECHNICAL SUPPORT: unlimited, toll number, M–F 9–10 a.m., 1–6 p.m.
OTHER SUPPORT: none
**Reader service no. 645**

**GoScript Plus 2.2**
LaserGo, Inc.
9369 Carroll Park Dr., Ste. A
San Diego, CA 92121
800/955-3668, 619/450-4600
LIST PRICE: 35 fonts $299, 13 fonts $149
REQUIREMENTS: 640K, hard disk, DOS 3.0 or later version, 1MB RAM for laser printers; 1MB or more expanded memory and math coprocessor recommended
TECHNICAL SUPPORT: unlimited, toll number, M–F 8–5
OTHER SUPPORT: BBS, monthly newsletter
**Reader service no. 646**

**PacificPage 2.58**
Pacific Data Products, Inc.
6404 Nancy Ridge Dr.
San Diego, CA 92121
619/552-0880
LIST PRICE: $695
REQUIREMENTS: HP LaserJet Series II with 2.5MB of RAM
TECHNICAL SUPPORT: unlimited, toll number, M–F 7–5
OTHER SUPPORT: BBS, newsletter
**Reader service no. 647**

**PreScript Deluxe 1.11**
Pan Overseas Computer
44 Rte. 46
Pine Brook, NJ 07058
201/808-1900
LIST PRICE: 35 fonts $395, 13 fonts $195
REQUIREMENTS: 640K, 2MB of extended memory, hard disk, DOS 3.1 or later version, PCL-compatible or LaserJet with 1MB printer RAM
TECHNICAL SUPPORT: unlimited, toll number, M–F 9–6
OTHER SUPPORT: newsletter
**Reader service no. 648**

**UltraScript PC Plus 2.0**
QMS/Imagen
2650 San Tomas Expwy.
Santa Clara, CA 95051
800/635-3997, 408/986-9400
LIST PRICE: 47 fonts $445, 25 fonts $195
REQUIREMENTS: 80286 or better, 640K, hard disk, DOS 3.1 or later version, 1MB RAM for laser printers; at least 800K of extended memory recommended
TECHNICAL SUPPORT: unlimited, toll-free number, M–F 9–5
OTHER SUPPORT: none
**Reader service no. 649**

# Winning Colors

**Looking for the key to attention-getting overheads and handouts? Our review of six color printers turns up a pair of Best Buys that transform everyday work into works of art.**

*Wes Nihei*

Color catches the eye and adds vitality to overhead projections and sales brochures. Carefully chosen colors can make a graphic element leap out at your customer and drive home a point. If your business or department uses presentations (on paper or overhead transparencies) to sell products or services, a high-quality color printer could be a smart investment.

In the past, businesses used color printers primarily for proofing page layouts and technical graphics before sending them out for professional printing or to avoid taking up large blocks of time on a plotter before the pages were perfect. Recently, thanks to lower prices and better software support, these printers have found a new primary business function as tools for creating high-quality presentation materials.

We looked at six color printers—two ink jets and four thermal transfers—that are aimed largely at the growing presentation markets: the $2495 Hewlett-Packard PaintJet XL, the $3800 Mitsubishi G330-70, the $9995 NEC Colormate PS, the $9995 QMS ColorScript 100 Model 10, the $8245 Seiko CH-5504, and the $7590 Tektronix Phaser CQ. *PC World* Best Buy honors went to the PaintJet XL for its speed and low price and to the ColorScript 100 for the fine quality of its PostScript output.

None of these color printers is intended to replace a laser printer. For one thing, expensive, coated paper is required for sharp images, and its shiny surface makes text-filled pages difficult to read. Furthermore, top-quality, 300-dpi (dot-per-inch) thermal transfer printers use smaller dots than lasers and thus produce thinly lined, anemic-looking characters that are hard to read. Moreover, special paper and inks bring the cost of using one of these printers to as much as 67 cents a page, compared to about 3 cents a page for the HP LaserJet Series II.

### Color Considerations

If color makes sense to you, a number of factors will probably influence your buying decision. First and foremost is output quality; you want the best-looking color documents your budget will allow. If you plan to create flyers or handouts, you want to be able to print multiple copies of a page without hanging up your computer. Software compatibility is important, of course, but with the programs we looked at here, it wasn't much of a problem.

TONY CARLSON

**Output Quality** Thermal transfer printers offer the best-looking output, but they're expensive to buy and to use. Color ink jet output is not as sharp or as vivid, but it can still look quite good—and it's a lot cheaper. Color dot matrix printers are also available, but low-quality output knocks them out of the running.

**Printing Multiple Copies** Color output can't be duplicated on a standard copying machine, so if you need copies, you'll probably have to print each page multiple times. Some non-PostScript-compatible printers can do so without tying up your computer; some can't. Fortunately, most color graphics programs have a driver that can order a PostScript printer to hold a page in memory and print multiple copies (freeing the computer for other tasks). All the PostScript-compatible printers reviewed here can do this trick.

**Software Compatibility** Most professional presentation packages support color printers —one way or another (see the sidebar "Why Your Favorite Software Isn't Color-Blind Anymore"). Four of the printers reviewed here come with PostScript or PostScript-compatible interpreters, so any application that supports color PostScript—and that includes virtually every major color graphics program—can drive them. The HP PaintJet XL isn't PostScript compatible, but it's specifically supported by the vast majority of graphics programs. Support for the Hewlett-Packard Graphics Language (HPGL or HPGL/2) is important if you're going to use your printer for preplot proofing. The Mitsubishi sidesteps the compatibility issue by

**Best Buy HP PaintJet XL (left) is fast and low priced. QMS's ColorScript 100 Model 10, also a Best Buy, offers superior PostScript output.**

FEATURES EVALUATION

## You Pay for Color—In Time *and* Dollars

*Hewlett-Packard's PaintJet XL, a Best Buy, is faster and less expensive than the competition. Our other Best Buy, the QMS ColorScript 100, has superior output and full PostScript support.*

● Yes
○ No

| | Hewlett-Packard PaintJet XL | Mitsubishi G330-70 | NEC Colormate PS | QMS ColorScript 100 Model 10 | Seiko CH-5504 | Tektronix Phaser CQ |
|---|---|---|---|---|---|---|
| **Standard features** | | | | | | |
| List price | $2495 | $3800 | $9995 | $9995 | $8245 | $7590 |
| Rated cost per page | 30¢ | 67¢ | 67¢ | 67¢ | 67¢ | 28¢ |
| Engine | Hewlett-Packard | Mitsubishi | NEC | Mitsubishi | Seiko | Sharp |
| Print technology | ink jet | thermal transfer | thermal transfer | thermal transfer | thermal transfer | ink jet |
| **Paper handling** | | | | | | |
| Capacity (sheets) | 200 | 100 | 100 | 100 | 145 [1] | 100 [2] |
| Prints legal size | ● | ○ | ○ | ● | ● | ● |
| Prints transparencies | ● | ● | ● | ● | ● | ● |
| Prints A4 size | ● | ● | ● | ● | ● | ● |
| **Memory capacity** | | | | | | |
| Standard memory | 512K | 512K | 8MB | 4MB | 3MB | 8MB |
| Maximum memory | 512K | 512K | 8MB | 8MB | 3MB | 11MB |
| **Typographic features** | | | | | | |
| Resolution (dpi) | 180 | 150 | 300 | 300 | 300 | 216 |
| Rated speed (ppm) [3] | 1.5 | 1.3 | 1 | 1 | 1 | .5 |
| Prints multiple copies in background | ○ | ● | ● | ● | ● | ● |
| Prints PostScript files | ○ | n/a | ● | ● | ● | ● |
| Prints HPGL/2 files | ○ | n/a | ○ | ● [4] | ○ | ● |
| Resident fonts | 3 [5] | n/a | 35 | 35 | 35 | 35 |

[1] Roll paper.
[2] Tractor-feed option available.
[3] Rated speed for printing 8½-by-11-inch pages of graphics.
[4] Extra-cost option.
[5] Optional 20-font cartridge available.

using a software-independent video interface.

**Speed** None of these printers is a speed demon. Most thermal transfer printers have to roll a page through the print engine four times—once for each color—and even ink jets are slow compared with a laser. We had National Software Testing Laboratories (NSTL) test five of the six printers and found that the HP PaintJet XL ink jet was the fastest, with the thermal NEC Colormate PS a distant second. Because of the Mitsubishi's video interface, NSTL wasn't able to test it comparatively. But it was very quick, printing a screen in under 80 seconds.

**Other Issues** A large and expandable selection of fonts is handy for designing presentations, and in this regard the four PostScript printers have a definite advantage. Paper handling is a particular challenge for thermal printers, which run each sheet through the engine four times; a printer that can do this without jamming will save you a number of headaches. Memory capacity is especially

important for PostScript printers—a 300-dpi device, for instance, needs at least 3MB to create a bit-mapped page from PostScript code. To download additional fonts, even more memory is required.

Buying a color printer is a major investment. By paying attention to the features you need most, you can make it a profitable one.

## Hewlett-Packard PaintJet XL

The $2495 HP PaintJet XL, a *PC World* Best Buy, is a fast, inexpensive ink jet printer. Its output isn't as bright and sharp as the thermals', but it's still perfectly presentable. The HP came in first in every NSTL speed test, printing, for example, a simple pie chart in under half a minute. Moreover, virtually every graphics program has a driver for it.

The PaintJet's 180-dpi output is quite acceptable; colors look muted and borders fuzzy only when compared to output from a thermal color printer. The PaintJet's black text printing is also better than average, reaching 24-pin dot matrix quality.

Because the PaintJet XL can print a full page without holding it in memory, the printer's low 512K of RAM produces only one serious drawback: The XL can't print multiple copies without tying up your computer. At press time, HP was preparing a $995 HPGL/2 plotter-emulation cartridge with enough on-board RAM to remedy this problem. However, current PaintJet drivers don't support this feature; until they do, it will be accessible only through a plotter driver or custom escape sequences.

The XL is quite easy to use. Each of its four ink cartridges (one for each color) contains its own printhead, so every time you replenish one color of ink, you also replace that color's nozzle. The 200-sheet cassette has the largest capacity in the roundup and is adjustable for letter- and legal-size paper and transparencies. You get only 3 internal fonts, but for $225 you can buy an optional font cartridge with 20 more.

The HP's colors could be more vivid, but they're still attractive—and its speed, compatibility, and low price more than compensate to earn it a Best Buy.

**EXECUTIVE SUMMARY**

**Hewlett-Packard PaintJet XL**

*Color printer*

BEST BUY

A rock-bottom price makes the PointJet XL on excellent value. Good 180-dpi color graphics, reliable paper handling, and easy maintenance add to its worth.

| | POOR | FAIR | GOOD | EXCELLENT |
|---|---|---|---|---|
| Color quality | | | ● | |
| Text quality | | | ● | |
| Paper handling | | | | ● |
| Memory capacity | | ● | | |
| Typographic features | | ● | | |
| Overall value | | | | ● |

**Reader service no. 636**

## Mitsubishi G330-70

The $3800 Mitsubishi G330-70 is a video printer: It prints directly from the screen rather than via an application's printer driv-

**EXECUTIVE SUMMARY**

**Mitsubishi G330-70**

*Color printer*

The G330 video printer can make quick color prints, but its output quality doesn't measure up to that of the other printers reviewed. Not recommended.

| | POOR | FAIR | GOOD | EXCELLENT |
|---|---|---|---|---|
| Color quality | ● | | | |
| Text quality | ● | | | |
| Paper handling | | | ● | |
| Memory capacity | | | ● | |
| Typographic features | | ● | | |
| Overall value | ● | | | |

**Reader service no. 637**

The HP came in first in every speed test, printing a simple pie chart in under half a minute.

Hewlett-Packard PaintJet XL

Mitsubishi G330-70

NEC Colormate PS

QMS ColorScript 100 Model 10

Seiko CH-5504

Tektronix Phaser CQ

**The NEC, Seiko, and Best Buy QMS thermal printers print the full range of blue in our sample output. The Tektronix and Best Buy HP ink jets turn the lighter blue to green. The Mitsubishi video printer can't print the file directly; it can print only the lower-quality screen image.**

er; it can't, for example, print a *PageMaker* document. Multiple copies of the same screen can be printed easily via an option on the printer's control panel. Unfortunately, the G330's 150-dpi color output is unacceptably fuzzy.

A video printer is easy to use and frees you from software compatibility concerns. Simply plug the printer into your video port, plug your monitor into the printer, and press two buttons to print the image that's on your screen.

Aside from blurry output, however, the G330-70 has another major drawback: Since it prints *everything* on the screen, including menus and icons, it's best used only with programs that have a "show screen" feature for filling the entire screen with your graphic.

In any case, poor output limits the G330's value for professional-looking presentations. You can do a lot better for the money.

## NEC Colormate PS

The brand-new $9995 Colormate PS features an Adobe PostScript interpreter and delivers crisp, 300-dpi output with vivid colors. It's the fastest thermal transfer printer we tested, printing the pie chart in just over a min-

### EXECUTIVE SUMMARY

**NEC Colormate PS**

*Color printer*

The Colormate PS is a well-built Adobe PostScript thermal transfer printer with excellent color output. Its main drawback is a tendency toward paper jams.

| | POOR | FAIR | GOOD | EXCELLENT |
|---|---|---|---|---|
| Color quality | | | | ● |
| Text quality | | ● | | |
| Paper handling | | ● | | |
| Memory capacity | | | | ● |
| Typographic features | | | | ● |
| Overall value | | | ● | |

**Reader service no. 638**

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ute. You get 8MB of RAM standard, as well as a SCSI port to accommodate an optional 20MB hard disk for storing fonts. Its major failing is a tendency to jam.

The Colormate is so new that software drivers are still scarce. Fortunately, one PostScript driver is usually pretty similar to another, and the Colormate worked fine with drivers for the QMS ColorScript and the Tektronix Phaser CQ—both fairly common. And since it's a PostScript printer, multiple copies are not a problem.

Paper handling is the NEC's biggest weakness, and not only because of the jamming (which lessened in severity as the printer warmed up). Additional problems: You can't print on anything larger than letter-size paper.

Still, if top-notch color output is your highest priority—and you don't mind keeping an eye on the paper path—this printer gives you a lot for the money.

## QMS ColorScript 100 Model 10

At $9995, the QMS ColorScript 100 Model 10 ties with the Colormate as the most expensive printer reviewed. Also like the NEC, it has a thermal transfer engine that creates beautiful, color-saturated, 300-dpi, Adobe PostScript output; there's even a SCSI port for an external hard disk. Although it comes with only 4MB of standard RAM (4MB less than the NEC), its passable paper handling nudges it past the NEC for a *PC World* Best Buy.

## WHY YOUR FAVORITE SOFTWARE ISN'T COLOR-BLIND ANYMORE

If you buy a color printer, will you be able to use it with your favorite graphics programs? Increasingly, the answer is yes. Software drivers that work with the PaintJet XL have been common for years, and within the last year drivers for the newer color PostScript printers have begun to appear in significant numbers, at least in professional graphics packages.

Ashton-Tate's *Applause II*, Software Publishing's *Harvard Graphics*, and Digital Research's *GEM* line of graphics programs all have capable color PostScript drivers. Lotus's *Freelance Plus* doesn't have one yet, but at press time a driver was being prepared for release.

If it seems odd that popular graphics programs like *PageMaker* and *Corel Draw* are absent from this list, it's because, as *Windows* applications, they use printer drivers written for the operating environment rather than for the individual applications. And as of this writing, Microsoft has yet to ship a color PostScript driver with *Windows*.

In November of 1989, Microsoft *did* make a color PostScript driver available—but it has not yet been included in the shipping product; you have to call and ask for it. The good news is that it's free. The driver will be bundled with future versions of *Windows*.

There is an alternative, however. Since 1988, a *Windows* color PostScript driver has been available from Micrografx, the publisher of *Designer*, *Draw Plus*, and other *Windows* applications. According to Brad Merkoe, program manager for printer drivers, "There's demand from our users, so we've made a definite commitment to support color." Micrografx sells the driver, which works with any *Windows* program, for $199.95, in addition to bundling it with its own *Windows* applications.

A year ago, finding a graphics program that would talk to a color PostScript printer was a considerable challenge. Today, between Micrografx and Microsoft, *Windows* users can choose between drivers, and it's a safe assumption that if your favorite non-*Windows* graphics program doesn't already include color PostScript support, it will soon. —*W. N.*

### WHERE TO BUY

**Microsoft Windows Color PostScript Driver**
Microsoft Corp.
One Microsoft Way
Redmond, WA 98052
206/454-2030
No fee
**Reader service no. 642**

**PostScript Driver**
Micrografx
1303 Arapaho
Richardson, TX 75081
800/272-3729
LIST PRICE: $199.95
**Reader service no. 643**

The QMS creates beautiful, color-saturated Adobe PostScript output.

## EXECUTIVE SUMMARY

### QMS ColorScript 100 Model 10

*Color printer*

The ColorScript gives you top-notch color output and Adobe PostScript. Despite its high price and a few minor paper-handling problems, it delivers solid value.

| | POOR | FAIR | GOOD | EXCELLENT |
|---|---|---|---|---|
| Color quality | | | | ● |
| Text quality | | ● | | |
| Paper handling | | | ● | |
| Memory capacity | | | ● | |
| Typographic features | | | | ● |
| Overall value | | | | ● |

**Reader service no. 639**

Like all the PostScript printers here, the ColorScript can easily manage multiple copies. However, every once in a while it sucks in finished sheets from the output tray as it retracts the current page for another pass. (You can prevent this by removing completed pages promptly.) An adjustable paper cassette holds 100 sheets of letter- or legal-sized paper.

You'll pay top dollar for this Best Buy, but it's worth it. Most of the time the ColorScript works smoothly—and it always produces great color output.

## Seiko CH-5504

The Seiko CH-5504 comes in several configurations. We looked at the fully equipped $8245, 3MB, PostScript-compatible unit that promised to offer multiple-copy capability and the widest software support. Its 300-dpi color output is on a par with that of the other thermal transfer printers reviewed, but its cramped 3MB memory ceiling and clumsy, software-based PostScript emulation are serious drawbacks.

PostScript "compatibility" comes in the form of CAI's *Freedom of Press* program. To use this program, you must first print to disk, then exit your application, and then run *Freedom of Press* to interpret the file and send it to the printer. (For a complete review of this program, see "PostScript the Hard Way" in this issue.)

The CH-5504 features solid paper handling, cutting its own letter- and legal-size sheets and transparencies from rolls (and saving you the trouble of switching trays). The cut sheets are indistinguishable from packaged paper.

This printer gives you good-looking output, but its awkward PostScript support and meager memory diminish its value. You can do better.

## EXECUTIVE SUMMARY

### Seiko CH-5504

*Color printer*

The Seiko's color output is as good as any, but clumsy PostScript emulation and cramped memory capacity are major disadvantages.

| | POOR | FAIR | GOOD | EXCELLENT |
|---|---|---|---|---|
| Color quality | | | | ● |
| Text quality | | ● | | |
| Paper handling | | | | ● |
| Memory capacity | | ● | | |
| Typographic features | | | ● | |
| Overall value | | | ● | |

**Reader service no. 640**

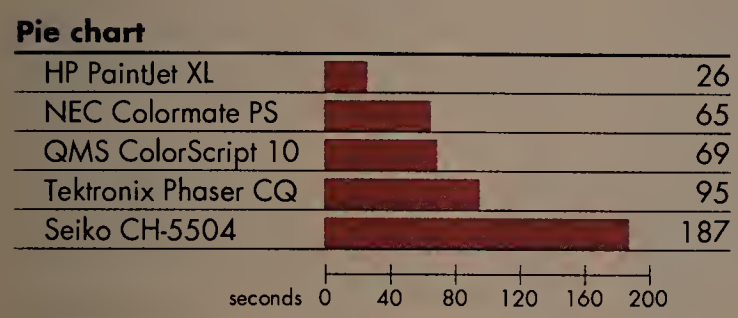
## Tektronix Phaser CQ

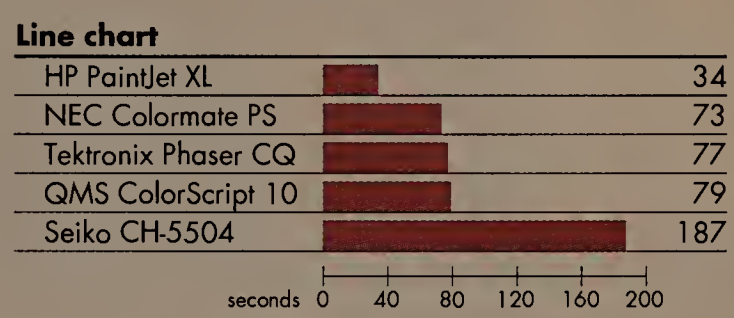
The $7590 Phaser CQ is a two-part package that includes Tektronix's ColorQuick 216-dpi ink jet printer and color PostScript-compatible Phaser Card. Although the Phaser CQ offers the cheapest color PostScript compatibility we've seen, the ColorQuick's print quality isn't worth the price.

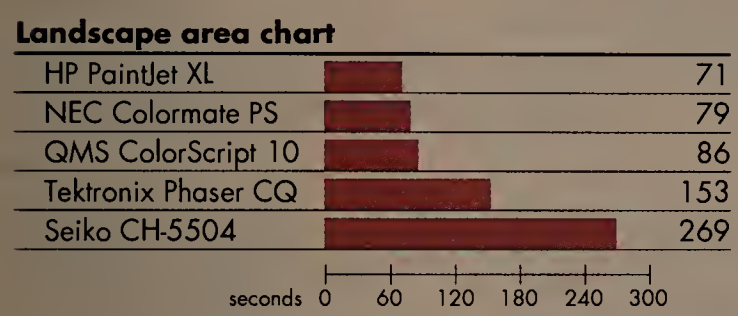
While the CQ produces noticeably sharper color output than HP's PaintJet, the other ink jet reviewed, the difference doesn't merit an additional $5000. Like the PaintJet's monochrome text, the ColorQuick's rivals that from a good 24-pin dot matrix. Thanks to its PostScript emulation, however, printing multiple copies with the Phaser CQ is much simpler.

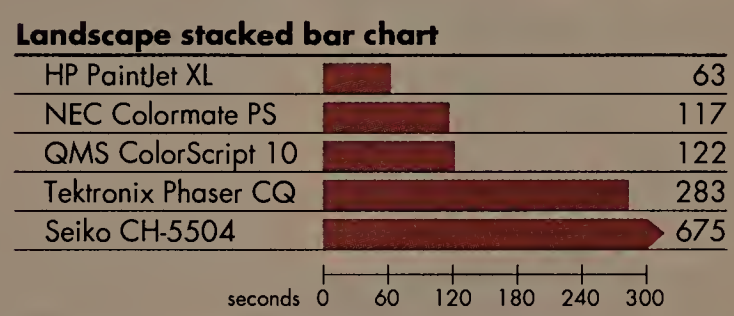
## Color Fast: HP's Speedy PaintJet XL Earns a Best Buy

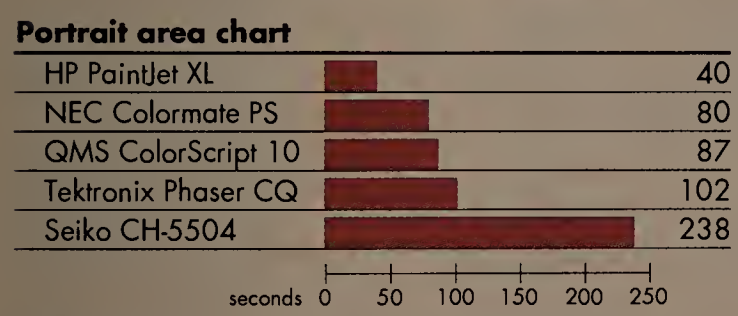
Freed of time-consuming PostScript interpretation and four-pass thermal printing, Hewlett-Packard's PaintJet XL is an easy winner in every test. NEC's Colormate PS is the leader of the PostScript pack.

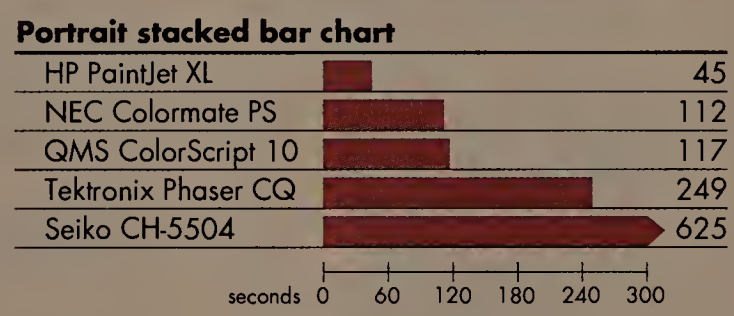



**Methodology**
Tests were conducted on o 12-MHz Compoq Deskpro 286e with 3MB of RAM, DOS 3.31, ond o 40MB hord disk. Test files were run from o 2MB RAM disk to moximize performonce. Our test suite wos not opplicoble to the Mitsubishi G330-70 becouse the printer is incopoble of printing files ond will print only screen shots.

**Pie chart**
An *Excel* pie chort with one exploding slice is printed in high resolution.

**Landscape area chart**
An *Excel* oreo chort with color fill is printed in landscope mode.

**Portrait area chart**
An *Excel* line chort with color fill surrounding the font within the heoder is printed.

**Line chart**
An *Excel* line chort with color fill is printed in portroit mode.

**Landscape stacked bar chart**
A Microgrofx *Groph Plus* stocked bor chort using four color stocks, 3-D shoding, ond four font types is printed in londscope mode.

**Portrait stacked bar chart**
A Micrografx *Groph Plus* stocked bor chort using four color stocks, 3-D shoding, and four font types is printed in portroit mode.

**Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.**

The ColorQuick manages paper-handling chores with aplomb. An adjustable sheet feeder will handle letter, legal, or 11-by-17-inch sheets, and you can purchase an optional tractor feeder for fanfold paper. Ink handling is messy, however, and can lead to rainbow-colored fingers and stained clothes. Furthermore, the Phaser Card takes up a slot in your PC, and you'll need 3MB of free disk space for supporting software.

Still, the Phaser CQ's main drawback is its price, which is much too high for ink jet quality. If you want great-looking color PostScript, you're better off paying $2400 more for the QMS, and if you want a bargain, the HP is a better one.

## EXECUTIVE SUMMARY

### Tektronix Phaser CQ

*Color printer*

This 216-dpi printer offers surprisingly good output for an ink jet, but its relatively hefty price tag makes other printers in the review better bargains.

| | POOR | FAIR | GOOD | EXCELLENT |
|---|---|---|---|---|
| Color quality | | | ● | |
| Text quality | | | ● | |
| Paper handling | | | ● | |
| Memory capacity | | | | ● |
| Typographic features | | | ● | |
| Overall value | | | ● | |

**Reader service no. 641**

### Final Colors

The Best Buys in this roundup are at the top and bottom of the price range. On the low end, the $2495 HP PaintJet XL makes the grade with fine, slightly muted colors, broad software support, and a tempting price tag. The $9995 QMS ColorScript offers excellent 300-dpi color output, Adobe PostScript, and dependable paper handling.

A good color printer is a significant investment, and if you're not careful, you can get less than you bargained for. If you choose well, however, you can acquire a tool that will make your output shine. ●

*Wes Nihei is an associate editor for* PCGames *and a freelance writer; he lives in San Francisco.*

**For more information about all products in this article, circle reader service no. 904.**

## WHERE TO BUY

**Hewlett-Packard PaintJet XL**
Hewlett-Packard
Customer Information Center
19310 Pruneridge Ave.
Cupertino, CA 95014
800/752-0900
LIST PRICE: $2495
ACCESSORIES: ink cartridge $29.95; 200 sheets (letter size) $20.95; font cartridge $225, HPGL/2 plotter cartridge (not available at press time) $995
WARRANTY: one year parts and labor
EXTENDED WARRANTY: $48 a year, on site $72 a year
TECHNICAL SUPPORT: unlimited, toll free number, M–F 9–5
OTHER SUPPORT: none
**Reader service no. 636**

**Mitsubishi G330-70**
Mitsubishi Electronics America
991 Knox St.
Torrance, CA 90502
800/556-1234, 800/441-2345 California, 213/217-5732
LIST PRICE: $3800 (includes paper cassette and video adapter)
ACCESSORIES: ink roll $100
WARRANTY: 180 days
EXTENDED WARRANTY: none
TECHNICAL SUPPORT: unlimited, toll number, M–F 7–5
OTHER SUPPORT: none
**Reader service no. 637**

**NEC Colormate PS**
NEC Technologies, Inc.
1414 Massachusetts Ave.
Boxborough, MA 01719
508/264-8000
LIST PRICE: $9995
ACCESSORIES: ink roll $90, 20MB hard disk $995
WARRANTY: one year parts and labor
EXTENDED WARRANTY: custom service plans available
TECHNICAL SUPPORT: unlimited, toll-free number, M–F 8:30–5
OTHER SUPPORT: none
**Reader service no. 638**

**QMS ColorScript 100 Model 10**
QMS
One Magnum Pass
Mobile, AL 36618
800/631-2692
LIST PRICE: $9995
ACCESSORIES: 4MB RAM upgrade $1495; 2000 sheets (letter size) $125; ink roll $105; 20MB hard disk $995, 40MB hard disk $1495
WARRANTY: 90 days parts and labor
EXTENDED WARRANTY: return to factory $870 per year; on site first year $1269, each subsequent year $1450
TECHNICAL SUPPORT: unlimited, toll number, M–F 8–5
OTHER SUPPORT: none
**Reader service no. 639**

**Seiko CH-5504**
Seiko Instruments U.S.A.
Graphic Devices and Systems Division
1130 Ringwood Ct.
San Jose, CA 95131
800/873-4561
LIST PRICE: $8245 (includes 3MB of RAM and Freedom of Press)
ACCESSORIES: ink rolls (4 rolls per box) $320, roll paper (4 rolls per box) $65
WARRANTY: 90 days return to factory
EXTENDED WARRANTY: on site first year $800, each subsequent year $863
TECHNICAL SUPPORT: toll-free number, M–F 8–5
OTHER SUPPORT: none
**Reader service no. 640**

**Tektronix Phaser CQ**
Tektronix
Graphics Printing and Imaging Division
P.O. Box 1000, M-S 63-630
Wilsonville, OR 97070
800/835-6100
LIST PRICE: $7590
ACCESSORIES: tractor feeder $300, 500 sheets (letter size) $39, ink refills $12 (per color), maintenance cartridge $18, 3MB RAM upgrade $1500
WARRANTY: 90 days
EXTENDED WARRANTY: one year $838, two years $1779, three years $2367
TECHNICAL SUPPORT: unlimited, toll-free number, M–F 6–5
OTHER SUPPORT: field representatives
**Reader service no. 641**

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- *It's easier to use, because it has only one command. Your word processor does the rest.*
- *Inserts messages directly into the text to point out problem areas in letters, proposals, reports.*
- *Now runs from within WordPerfect 5.0 & 5.1!*
- *Indexes measure strength of delivery, readability, use of adverbs, adjectives, jargon.*
- *Uses more then 4,500 rules to make recommendations.*
- *New Menu System allows you to customize RightWriter to meet your particular needs.*

### Now Runs From Within WordPerfect 5.0 & 5.1!

This feature makes RightWriter 3.1 the perfect add-in for WordPerfect users.

**Specific Recommendations** *RightWriter flags common writing errors such as passive voice, noun-verb agreement and more.*

**Readability And Strength Index** *The Readability Index shows the educational level a reader requires to understand your writing. Also measures your writing's strength.*

**Parts of Speech, Sentence Structure** *Other indexes measure your adjective and adverb usage, and use of jargon. Recommendations guide you in how to improve your sentence structure.*

**Words to Review** *The Words In Review list points out problem words that could cause confusion in your writing.*

## RightWriter vs. The Competition.

*Dr. Cynthia L. Selfe, Associate Professor of the Humanities Department at Michigan Technological University independently tested the big three grammar and style checkers. The results? — RightWriter wins hands down!*

Researchers at Michigan Technological University tested the three IBM PC-based grammar and style checkers. The following is an excerpt from the letter which accompanied their findings...

"We've finished our independent tests comparing the performance, accuracy and usefulness of RightWriter 3.1, Grammatik IV and Perfect Grammar on two separate documents. RightWriter impressed us as far as style-analysis programs go: RightWriter correctly flagged 176 errors (with a total error rate of only 8%) in an essay that saw more than 20 major revisions.

RightWriter has such a low error rate that the program rewards users instead of overwhelming them. RightWriter's manual was also both easier to read and more informative than either Grammatik's or Perfect Grammar's. RightWriter's problem explanations form a good refresher course in grammar and style.

We believe RightWriter would be of value to writers interested in improving the surface structure of their writing. We applaud RightSoft's attempts to test their products thoroughly and in realistic situations.

Sincerely, Dr. Cynthia L. Selfe."

*Associate Professor, Humanities Department*
*Michigan Technological University, Houghton, Michigan*

## Which Grammar Checker Would You Trust?

| Results for *Test Document 1* | RightWriter 3.1 | Grammatik IV |
|---|---|---|
| Total Flags* | **4124** | 1290 |
| Correct Flags* | **4065** | 1118 |
| Incorrect Flags** | **59** | 172 |
| Error Rate | **1%** | 13% |

| Results for *Test Document 2* | RightWriter 3.1 | Grammatik IV |
|---|---|---|
| Total Flags* | **201** | 182 |
| Correct Flags* | **174** | 118 |
| Incorrect Flags** | **27** | 64 |
| Error Rate | **13%** | 35% |

**A higher value is better. **A lower value is better.*

**TEST NOTES:** *Flags were identified as "incorrect" if the program suggested textual changes where none were required or each time a program flagged a compound adjective as possibly mispunctuated when the word was punctuated correctly.*

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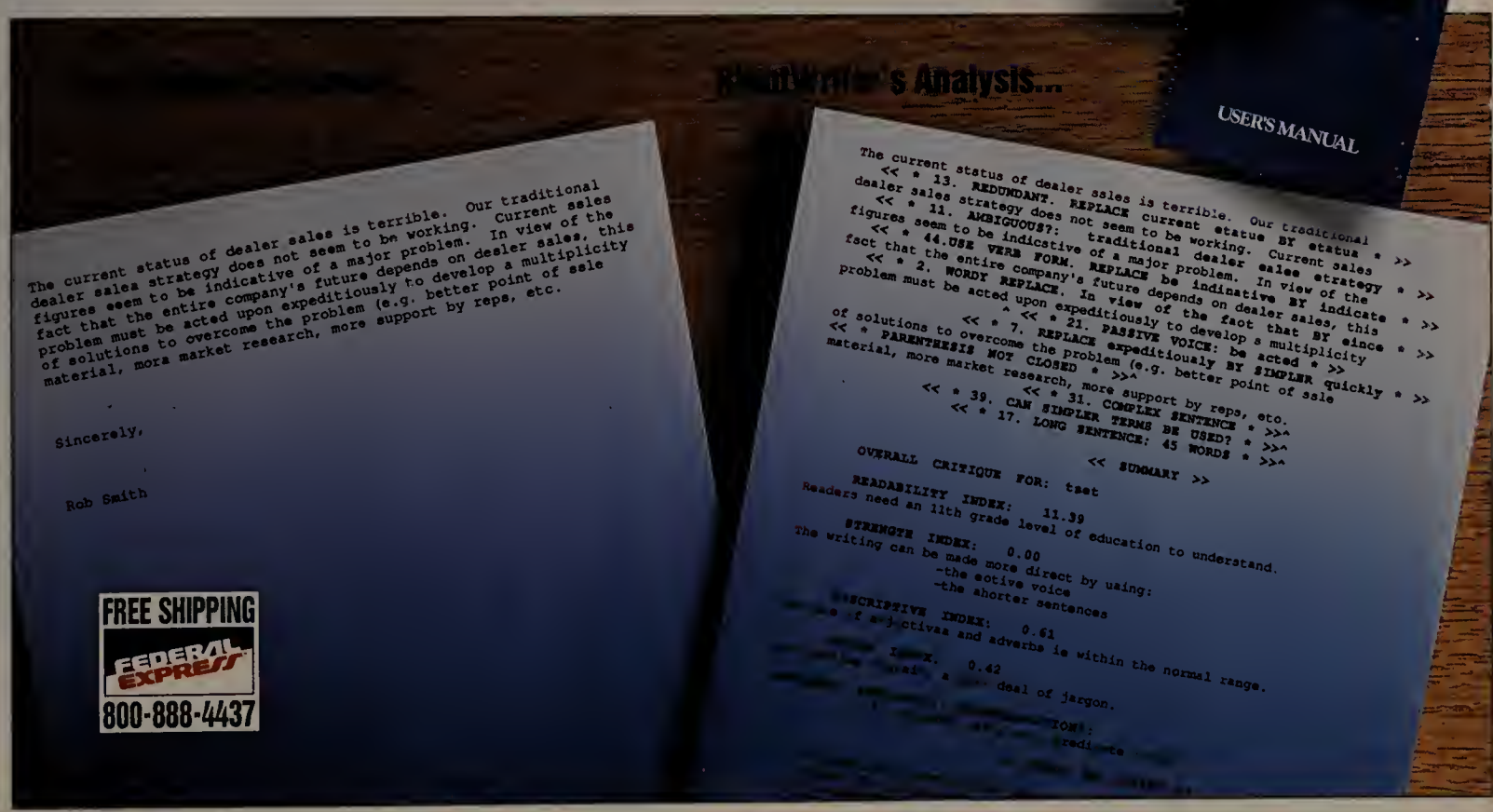



Circle 259 on reader service card

# Smart Monitors, Smart Buys

**As color video standards continue to evolve, intelligent multiscan monitors are becoming indispensable.**

**With three Best Buys to choose from, there's something for every budget.**

*TJ Byers*

Does your favorite application need super-VGA color graphics to run at its best? Is a sexy 8514/A monitor too pricey for your pocketbook? Do you want to keep an upgrade path open to future video standards? Do you need to cycle one monitor between different PCs with different video boards? If you answer yes to any of these questions, then your smart buy is a multiscan monitor.

There are at present five widely used kinds of color graphics boards: CGA (320 by 200 resolution), EGA (640 by 350), VGA (640 by 480), super-VGA (640 by 480, 800 by 600, and sometimes 1024 by 768), and 8514/A (also 1024 by 768). Unlike conventional VGA monitors, which work only with standard VGA boards, multiscans also work with one or more of the other board types. (For more information on graphics boards, see "Buyers' Guide: Look Sharp With a Super-VGA Board" in this issue.)

To find the best multiscan values, *PC World* tested nine monitors: the Amdek AM/738 Smartscan, the Leading Technology 1432M, the Mitsubishi FA3415, the Nanao FlexScan 9060S, the NEC MultiSync 2A and 3D, the Panasonic PanaSync C1391, the Relisys RE5155, and the Seiko CM-1440. The Best Buys are the bargain-basement Leading Technology ($495), the exceptionally sharp Seiko ($899), and the $1049 NEC MultiSync 3D, which sets a new standard for multiscan flexibility.

Only about half the multiscans in this roundup work with all five board types. All work with both VGA and super-VGA boards and can display CGA and EGA graphics as emulated by these boards; however, several can't display 1024 by 768 super-VGA mode. Those that can will also accommodate IBM's 8514/A board. Most (but not all) work with CGA and EGA boards.

### Multiscan Buying Issues

For most people, the main reason for buying a multiscan monitor is to support super-VGA for applications like *Ventura Publisher* or anything that runs under *Windows*. In fact, if you want to run 800 by 600 super-VGA mode, a multiscan is your only choice. (There are no dedicated super-VGA monitors.)

A second group of users who want even higher resolution will find that the combination of a multiscan monitor and a 1024 by 768 super-VGA board is a good way to get 8514/A resolution and save money in the process. IBM's dedicated 8514 monitor costs $600 to $1100 more than these multiscans, and it doesn't deliver any better resolution.

A third group of users—mostly PC support types—will appreciate the multiscan's ability to work with a variety of video boards. With dedicated (single-mode) monitors, every time you swap components, you have to find a monitor to match the board. If you have a multiscan, you just plug it in and get back to work. But note that three of these multiscans work only with analog boards (VGA, super-VGA, and 8514/A). If you need a monitor that will work with digital CGA and EGA boards too, choose accordingly. (Multiscans with digital capability usually handle IBM and Hercules monochrome boards too, but a cheap mono monitor is more appropriate.)

Multiscan monitors may have difficulty maintaining the size or position of the image on the screen as the video mode changes. This problem occurs most often when you switch between applications, but it can also occur as you shift into graphics mode to view a spreadsheet graph or preview a page in your word processor. Usually the image can be corrected with the monitor's controls, but having to constantly adjust the display can be very annoying. Multiscan monitors eliminate this hassle by adjusting the image automatically, but most multiscans aren't flexible enough to auto-size *all* video modes properly—and not all adjustment circuitry works equally well.

**Our three Best Buy multiscan monitors: from left to right, the NEC 3D, the Seiko CM-1440, and the Leading Technology 1432M.**

PHOTO BY STAN MUSILEK/ILLUSTRATION BY STEVE LYONS, CREATED WITH PC PAINTBRUSH

FEATURES EVALUATION

## In the Market for a Multiscan? Look Closely...

*Since these multiscan monitors are smart enough to switch modes automatically, you won't need to adjust your screen settings often. Would-be buyers should focus on mode compatibility, then look for a fair price and a small dot pitch.*

● Yes
○ No
◒ Deficient

| | Amdek AM/738 Smartscan | Leading Technology 1432M | Mitsubishi FA3415 | Nanao FlexScan 9060S | NEC MultiSync 2A | NEC MultiSync 3D | Panasonic PanaSync C1391 | Relisys RE5155 | Seiko CM-1440 |
|---|---|---|---|---|---|---|---|---|---|
| **Standard features** | | | | | | | | | |
| Price | $835 | $495 | $1015 | $1059 | $799 | $1049 | $899 | $799 | $899 |
| Dot pitch (millimeters) | .31 | .31 | .28 | .28 | .31 | .28 | .31 | .31 | .25 |
| Tilt-and-swivel base | ● | ● | ◒[1] | ● | ● | ● | ● | ● | ● |
| **Compatibility** | | | | | | | | | |
| CGA, EGA boards[2] | ○ | ● | ● | ● | ○ | ● | ● | ● | ○ |
| VGA boards | ● | ● | ● | ◒[3] | ● | ● | ● | ● | ● |
| 800 by 600 super-VGA boards | ◒[4] | ◒[4] | ◒[4] | ◒[3] | ● | ● | ◒[4] | ◒[4] | ● |
| 1024 by 768 super-VGA, 8514/A boards | ◒[5] | ◒[5] | ◒[4] | ◒[3] | ○ | ● | ○ | ○ | ● |
| **Externally accessible controls** | | | | | | | | | |
| Horizontal position | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Horizontal size | ● | ◒[6] | ● | ◒[6] | ○ | ● | ● | ○ | ● |
| Vertical position | ○ | ● | ● | ● | ● | ● | ● | ● | ● |
| Vertical size | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Front-panel power switch | ○ | ● | ● | ● | ● | ● | ● | ● | ○ |

[1] Option costs extra.
[2] All monitors support emulation of CGA and EGA modes by VGA boards.
[3] Requires extra-cost cable.
[4] No auto-sizing.
[5] .31mm dot pitch not recommended for 1024 by 768.
[6] Limited-choice switch.

### Multiscans Are Still Monitors

Despite their unique capabilities, multiscans are still monitors. That means you still need to consider basic monitor buying issues like these:

**Size and Viewing Angle** All these monitors sport ample 14-inch screens, a good size for general use. And all but the Mitsubishi come with tilt-and-swivel bases that let you adjust the screen for comfortable viewing and minimal glare.

**Dot Pitch** Just because a monitor boasts 800 by 600 (or higher) resolution, there's no guarantee that the image will be sharp and readable. Sharpness is directly related to *dot pitch*, the distance between the tiny phosphor dots on the screen's inner surface. The smaller the dot pitch, the sharper the image (all other things, like focusing electronics, being equal). On a 14-inch screen, .31mm dot pitch is fine for 800 by 600 super-VGA and lower resolutions. However, at 1024 by 768, pixels overlap, causing an unacceptably dull and blurry image. A monitor with .28mm dot pitch gives a significantly sharper image at that resolution—but you'll pay a higher price.

**Product Irregularity** Theoretically, all examples of a particular model should display identical images, but in reality the quality of individual monitors varies. To be sure you don't get stuck with a lemon, check the unit for focus, brightness, sharpness, image

placement, and color accuracy in all the modes you need *before* you buy it.

**Price** Happily, multiscans aren't much more expensive than single-mode monitors. In fact, one of our Best Buys costs no more than many dedicated VGA monitors.

## Amdek AM/738 Smartscan

**PROS:** Trackball controls

**CONS:** Analog only, .31mm dot pitch, no manual VGA adjustment

The $835 Amdek AM/738 (also sold as the Wyse WY660) is a medium-priced, analog-only monitor. Although it's capable of displaying 1024 by 768 graphics, its .31mm dot pitch makes it a bad choice for those modes. The AM/738's size and position controls don't work in VGA mode, which can be frustrating if the factory setting is off. Auto-sizing works for all standard VGA modes (including CGA and EGA emulation); 800 by 600 super-VGA requires manual adjustment.

One nice touch: The brightness and contrast controls are large trackballs conveniently located on the right side of the cabinet along with the power switch. The size and position controls are located on the back of the cabinet, but they seldom require adjustment.

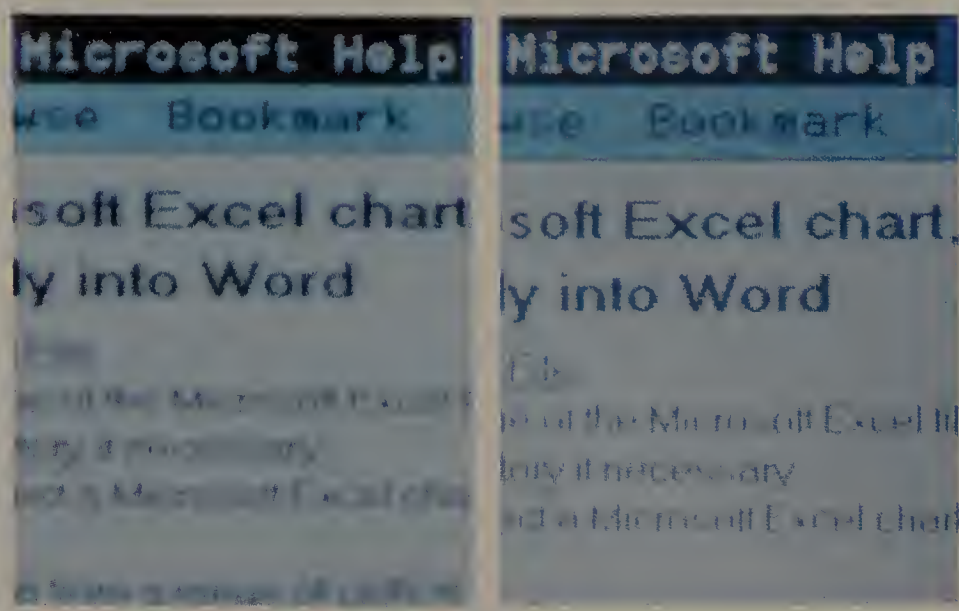
The AM/738 is quite expensive for an analog-only monitor with .31mm dot pitch. It's a poor value.

## Leading Technology 1432M

**PROS:** Very low price

**CONS:** Size controls hard to reach, .31mm dot pitch

At $495 the Leading Technology 1432M is the least expensive monitor in this roundup. Moreover, it supports the full range of modes from CGA through 1024 by 768. Auto-sizing works only from CGA to VGA, so you have to adjust super-VGA manually. That's a bit of a pain, since the controls you need are a gorilla's reach away on the back panel. The brightness and contrast knobs are on the front.




**A 1024 by 768 super-VGA image that is blurry and unreadable on the .31mm dot pitch Leading Technology 1432M (left) is much sharper on the .28mm dot pitch NEC 3D (right).**

The 1432M looks great in 800 by 600 mode, but at 1024 by 768, small fonts (like those used in some *Windows* help screens) are very hard to read. Though its awkward controls and limited auto-sizing are less than ideal, you'll have to pay $500 more to do much better. The 1432M's combination of rock-bottom price and support for 800 by 600 modes makes it a Best Buy for super-VGA seekers on a tight budget.

## Mitsubishi FA3415

**PROS:** Supports all boards, .28mm dot pitch

**CONS:** Expensive, limited auto-sizing, tilt-and-swivel base and analog cable cost extra

The Mitsubishi FA3415 boasts a sharp, .28mm dot pitch image and can handle everything from monochrome and CGA to 1024 by 768 super-VGA, but its auto-sizing is limited —and at $1015 it's one of the most expensive monitors in this roundup.

The auto-size range extends from CGA to VGA but not beyond. However, 1024 by 768 images are close enough to the size of VGA that you may not notice the difference. The 800 by 600 image, on the other hand, requires manual adjustment. Screen size and position controls are conveniently located under the screen, alongside the brightness and contrast controls. The digital/analog mode switch is located on a back panel.

Capable as it is, the FA3415 is still the most limited of the three .28mm dot pitch monitors in this roundup, yet it costs about the same as the others. It's not a great deal.

STAN MUSILEK

The pricey NEC 3D is the ultimate multiscan monitor.

## Nanao FlexScan 9060S

**PROS:** Supports all boards, .28mm dot pitch
**CONS:** Expensive

The costly $1059 Nanao FlexScan 9060S supports all video modes from CGA to 8514/A, has automatic digital/analog mode selection, and displays a crisp image thanks to its .28mm dot pitch. Moreover, its auto-sizing works well over the entire spectrum of video modes. All the screen controls are conveniently located directly below the screen.

This is, in fact, an extremely impressive monitor—but since the superior NEC MultiSync 3D costs about the same, it's not your smartest buy.

## NEC MultiSync 2A

**PROS:** None
**CONS:** Expensive, .31mm dot pitch, no digital board support

The MultiSync 2A is an analog-only monitor that supports only two modes: standard VGA and 800 by 600. The 2A was NEC's attempt to capture a share of the burgeoning VGA monitor market by offering super-VGA capability at a VGA price—but times and prices have changed, and the 2A hasn't. It still sells for $799, significantly higher than several full-range .31mm multiscans. It's a very bad buy.

## NEC MultiSync 3D

**PROS:** Supports all boards, "remembers" screen adjustments, .28mm dot pitch
**CONS:** Expensive

The ultimate multiscan monitor comes from NEC, manufacturer of the original multiscan, the MultiSync. The $1049 3D is pricey, but it boasts a sharp, .28mm dot pitch image and supports every standard video mode from CGA to 1024 by 768. It will even memorize screen settings for other modes.

Everything about the 3D is automated, from digital/analog selection to auto-sizing. It can distinguish between Paradise and Orchid 800 by 600 graphics and size each accurately—a feat no other multiscan monitor can match. In the rare instance that the 3D doesn't size a mode correctly, push-button controls located behind the front-panel cover plate make it easy to adjust the display. The 3D even "remembers" screen adjustments for as many as nine modes and restores them automatically the next time you switch to that mode.

Although you can get super-VGA support for less, the 3D is the most versatile multiscan monitor you can buy. If you crave super-VGA, plus plug-and-play performance in an office with a wide variety of video boards, this is the monitor for you.

## Panasonic PanaSync C1391

**PROS:** Convenient controls
**CONS:** .31mm dot pitch

The $899 Panasonic PanaSync C1391 is limited for a midpriced multiscan. It supports both digital and analog boards and goes up to only 800 by 600 resolution. It lacks auto-sizing beyond standard VGA, but since super-VGA requires only minor manual adjustment (and all screen controls are conveniently located under a front-panel plate), this problem isn't too serious. However, given its large dot pitch and limited range, the PanaSync is too expensive.

## Relisys RE5155

**PROS:** None
**CONS:** Limited auto-sizing, needs frequent adjustment, .31mm dot pitch

The $799 Relisys RE5155 is a digital/analog multiscan monitor that handles everything up to 800 by 600 super-VGA. Auto-sizing is claimed for CGA through standard VGA, but in practice the horizontal position requires frequent adjustment in all modes. Although that control is easy to reach, the constant fiddling is no fun. The RE5155 is not recommended.

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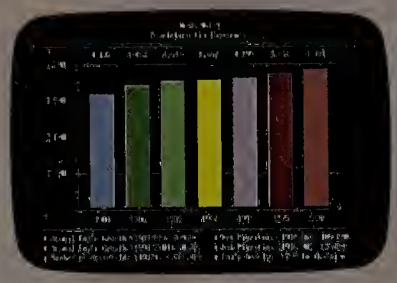

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## Seiko CM-1440

**PROS:** Flat screen, .25mm dot pitch
**CONS:** No digital board suppart

The $899 Seiko CM-1440, a *PC World* Best Buy, is a flat-screen Trinitron monitor whose razor-sharp .25mm dot pitch gives it the crispest image in this roundup. With the exception of brightness and contrast, which are located on the right side of the cabinet, all screen controls are on the back of the monitor. However, they seldom need adjusting because its smooth, accurate auto-sizing extends from VGA to 1024 by 768.

Unfortunately, the CM-1440 can't handle digital boards, but most people won't care. If you're looking for a monitor to run 800 by 600 and 1024 by 768 super-VGA today, or if you plan to run VGA now and upgrade later, the CM-1440 is the Best Buy for you.

### A Bevy of Best Buys

Whatever your reason for wanting a multiscan, there's a Best Buy here for you. If you need only VGA and 800 by 600 super-VGA, the $495 Leading Technology 1432M is a great value. For 1024 by 768 super-VGA today—or an upgrade path for tomorrow—the super-sharp $899 Seiko CM-1440 can't be beat. And if you need a monitor that will work with any video board in your office and support the full range of video modes, the NEC MultiSync 3D justifies its $1049 price.

The multiscan monitor, once a luxury item, has become an indispensable commodity. So long as PC video standards continue to evolve, multiscans will remain a crucial part of smart PC buying strategies. ●

*TJ Byers is a contributing editor for* PC World.

**For more information about all products in this article, circle reader service no. 901.**

### WHERE TO BUY

**Amdek AM/738 Smartscan**
Wyse Technalogy Inc.
3471 N. First St.
San Jase, CA 95134
800/722-6335,
408/922-5700
LIST PRICE: $835
ACCESSORIES: none
WARRANTY: one year ports ond labor
EXTENDED WARRANTY: none
TECHNICAL SUPPORT: toll-free number, M–F 5 a.m.–6 p.m.
OTHER SUPPORT: none
**Reader service no. 610**

**Leading Technology 1432M**
Leading Technology
10430 S.W. Fifth St.
Beoverton, OR 97005
800/999-5323,
503/646-3424
LIST PRICE: $495
ACCESSORIES: none
WARRANTY: ane yeor parts and labor
EXTENDED WARRANTY: avoiloble
TECHNICAL SUPPORT: tall-free number, M–F 7–5
OTHER SUPPORT: none
**Reader service no. 611**

**Mitsubishi FA3415**
Mitsubishi Electronics Americo, Inc.
991 Knox St.
Torronce, CA 90502
800/556-1234,
800/441-2345 Califarnia, 213/217-5732
LIST PRICE: $1015
ACCESSORIES: tilt-and-swivel base $30, onalag video coble $35
WARRANTY: one year parts and labor
EXTENDED WARRANTY: nane
TECHNICAL SUPPORT: tall-free number, M–F 7–5
OTHER SUPPORT: BBS
**Reader service no. 612**

**Nanao FlexScan 9060S**
Nonaa USA Corp.
23510 Telo Ave. #5
Tarrance, CA 90505
213/325-5202
LIST PRICE: $1059
ACCESSORIES: none
WARRANTY: ane year parts and labor
EXTENDED WARRANTY: none
TECHNICAL SUPPORT: tall number, M–F 9–5
OTHER SUPPORT: none
**Reader service no. 613**

**NEC MultiSync 2A, NEC MultiSync 3D**
NEC Technologies, Inc.
1255 Michael Dr.
Wood Dale, IL 60191
800/366-3632,
708/860-9500
LIST PRICE: MultiSync 2A $799, MultiSync 3D $1049
ACCESSORIES: none
WARRANTY: two years parts, one year labor
EXTENDED WARRANTY: nane
TECHNICAL SUPPORT: tall-free number, M–F 8:30–5:30
OTHER SUPPORT: none
**Reader service nos. 614, 615**

**Panasonic PanaSync C1391**
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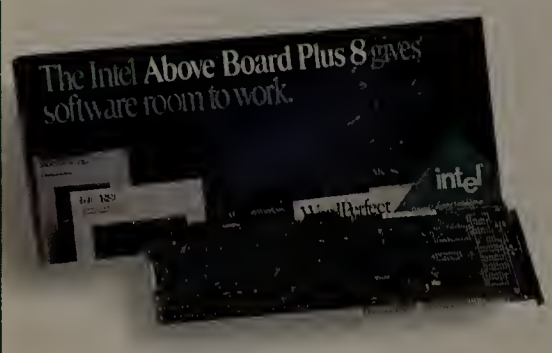
System Products Divisian
2 Panasonic Way
Secoucus, NJ 07094
800/447-4700,
201/348-7000
LIST PRICE: $899
ACCESSORIES: none
WARRANTY: ane year parts and labar
EXTENDED WARRANTY: nane
TECHNICAL SUPPORT: toll-free number, M–F 9–5
OTHER SUPPORT: none
**Reader service no. 616**

**Relisys RE5155**
Relisys Carp.
320 S. Milpitas Blvd.
Milpitas, CA 95035
408/945-9000
LIST PRICE: $799
ACCESSORIES: none
WARRANTY: two yeors parts, 15 months lobor
EXTENDED WARRANTY: available thraugh dealer
TECHNICAL SUPPORT: tall number, M–F 9–5
OTHER SUPPORT: nane
**Reader service no. 617**

**Seiko CM-1440**
Seika Instruments USA
PC Praducts Division
1144 Ringwoad Ct.
Son Jose, CA 95131
408/922-5900
LIST PRICE: $899
ACCESSORIES: none
WARRANTY: one yeor parts and labar
EXTENDED WARRANTY: none
TECHNICAL SUPPORT: toll number, M–F 8–4:30
OTHER SUPPORT: none
**Reader service no. 618**

# When your memory's low,

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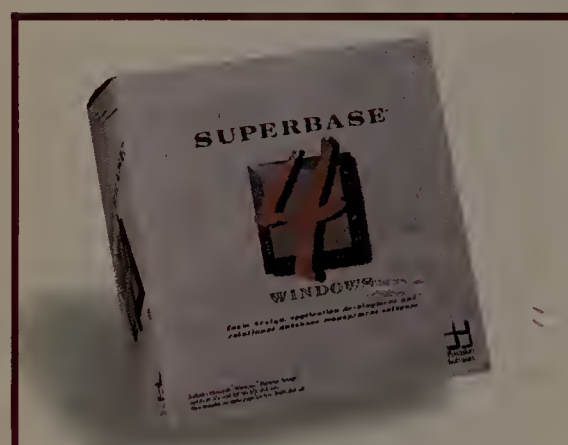


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4103 ▣Alpha Works 2.0 . . . . . 89.
**Application Techniques ... NCP**
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5494 ⊞News/Retrieval Membership Pkg. 24.
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3950 ▣Fastback Plus 2.1 . . . . . 109.
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4328 ▣Look & Link 1.1 ..... 59.
4384 ▣Ultravision 2.0 ..... 79.
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3146 ▣Advanced Utilities 4.5 ..... 89.
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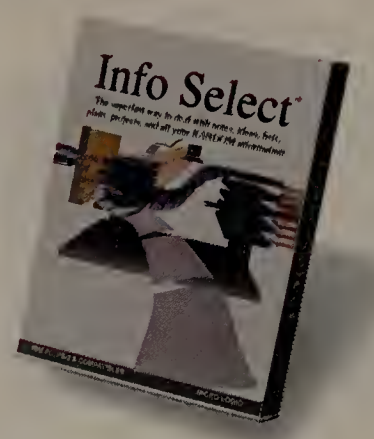


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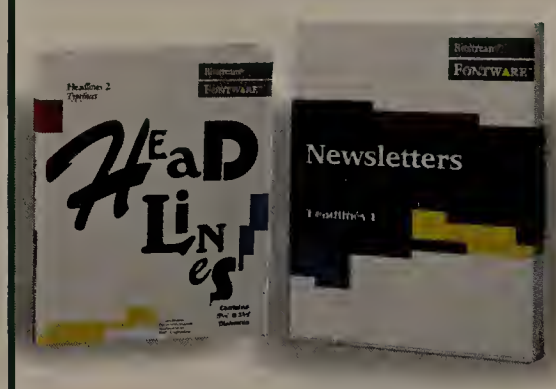


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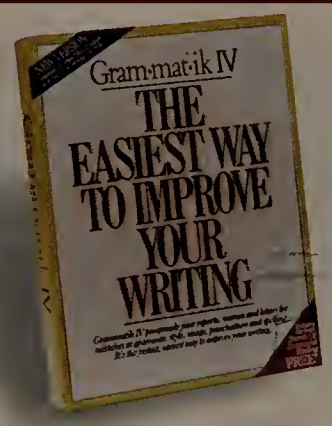


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| 4267 | Above Board Plus I/O 512k | 449. |
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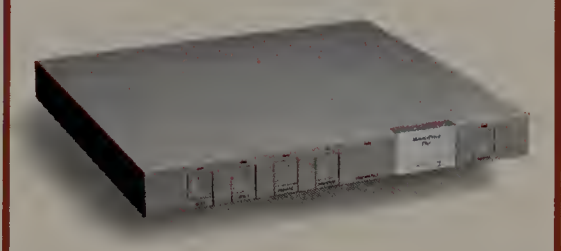

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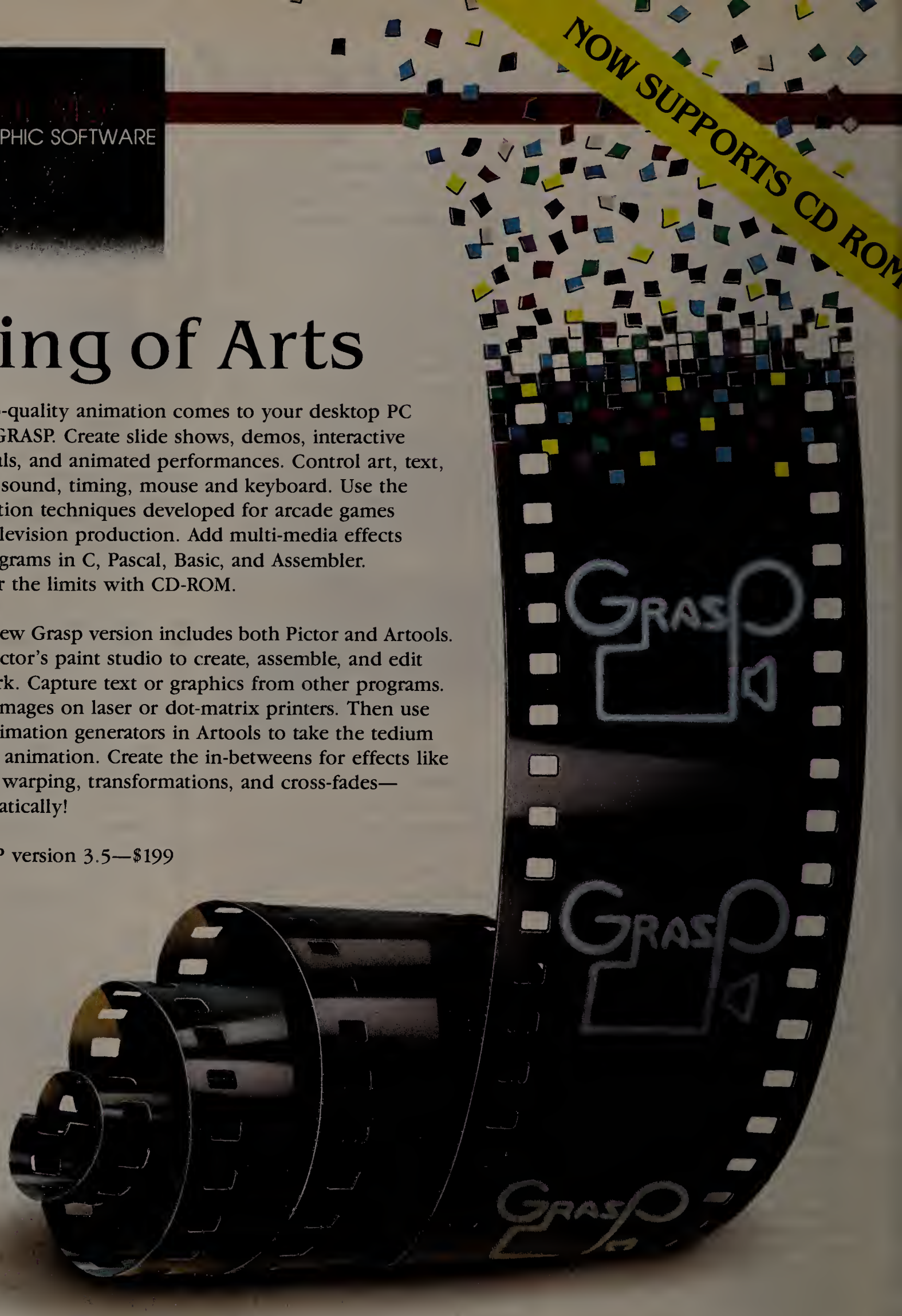


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SPECIAL REPORT

# WINDOWS

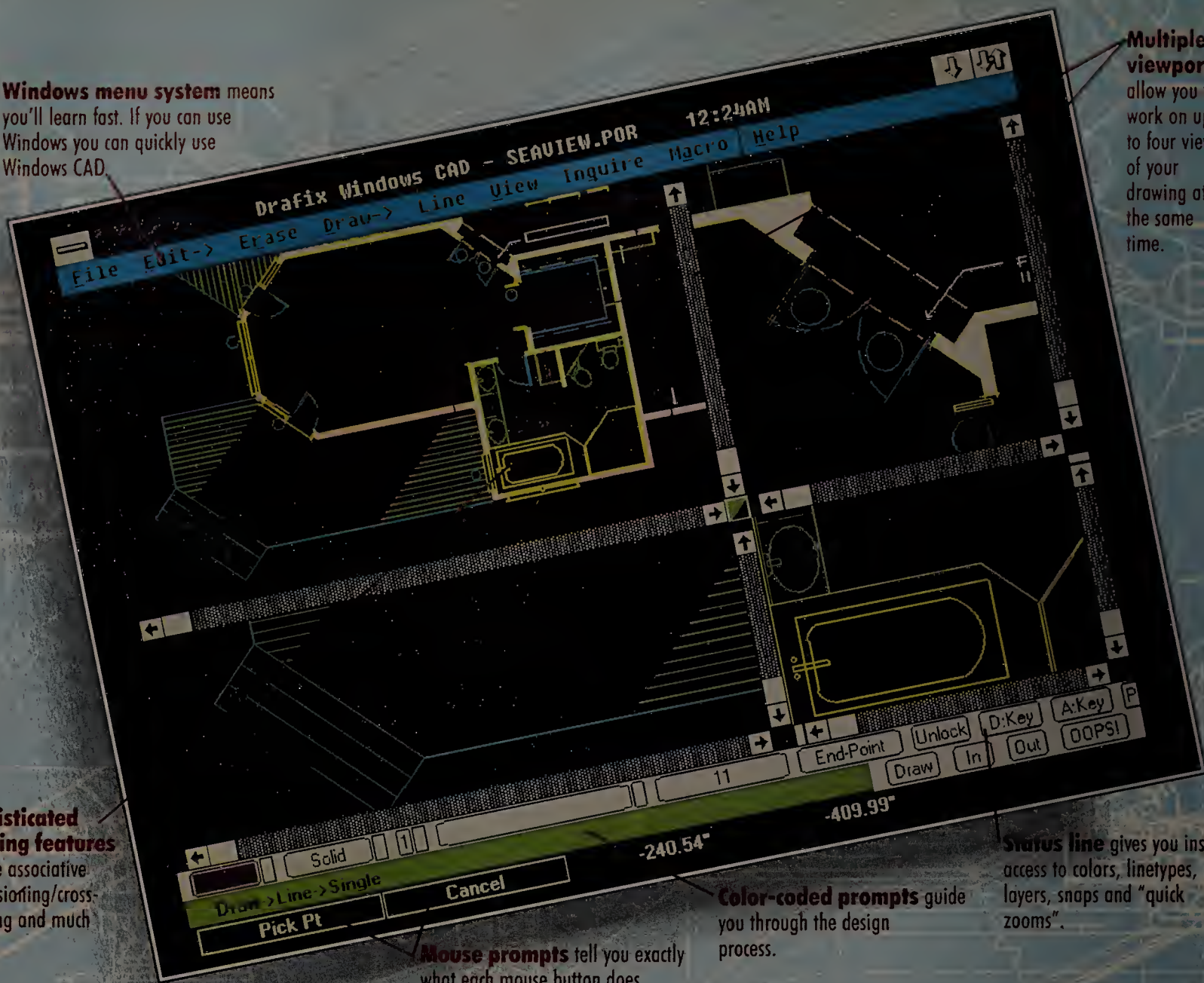
A PC World Supplement on Windowing Environments and Applications

Edited by Robert Luhn

151 FEATURE
Windows on the Corporation

156 PREVIEWS
Thinx
Unicom 1.4

160 REVIEWS
FrameMaker 2.0
Current 1.0
AutoCAD Release 10 for OS/2
Twindows 1.0
Infomark Express 1.1

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# WINDOWS ON THE CORPORATION

Although still in their infancy, OfficeVision and NewWave Office promise great benefits to users and corporations alike.

**Roberta Furger**

"THE IMPORTANCE OF THE DESKTOP METAPHOR IS THAT IT TAKES THE CAPABILITIES OF THE PC AND MAKES THEM USABLE."
ROBERT HOLMES, Southern California Gas

AMY ETRA

WOULDN'T IT BE great if you could forget about all the arcane syntax and idiosyncrasies associated with different hardware and software? Instead of worrying about what you named a file, whether program A was compatible with program B, and whether the information you needed was on a PC or a mainframe, you could simply concentrate on the job at hand, pulling graphics into a word processing file or sending off a report to associates throughout your company. The task of getting incompatible applications and files to work together would be done for you, behind the scenes.

That's the promise IBM and Hewlett-Packard hope to make good on with their "next-generation office systems," mammoth suites of server-based applications and services. Built upon graphical user interfaces, *OfficeVision* from IBM and *NewWave Office* from HP may ultimately eliminate not only the barriers between you and your PC but other obstacles as well, allowing co-workers who use different applications over various operating systems and platforms to share information.

WINDOWS

Both *OfficeVision* and *NewWave Office* include applications and services such as resource sharing on the network, electronic mail, word processing, and tools to access corporate data bases. Added to these basics will be your

favorite PC applications, which will ultimately hook into one of the two environments (see the sidebar "Lining Up Developers").

IBM and HP claim that *OfficeVision* and *NewWave Office* have something for everyone. For corporate management information systems (MIS) and data processing departments, the packages provide a mechanism for integrating PCs and larger systems. And for PC users they offer the prospect of being able to take advantage of all of a corporation's resources from the comfort of familiar applications and a graphical user interface.

**The PC Connection**

It's no coincidence that a graphical workstation is at the heart of both *NewWave Office* and *OfficeVision*. HP and IBM are trying to eliminate some of the difficulties of working with disparate applications and interfaces by building upon the PC's two most promising graphical environments, *Windows* and Presentation Manager.

"The importance of the desktop metaphor is that it takes the capabilities of the PC and makes them usable, without forcing people to become computer literate," says Robert Holmes, a computer technology evaluation analyst with Southern California Gas (SCG) in Los Angeles.

Paul Grayson, CEO of Micrografx in Richardson, Texas, cites the friendlier interface as the prime benefit of *OfficeVision* and *NewWave Office*. "Current PC users have to understand programs, files, and hard disks," he notes. "These environments try to eliminate some of that."

HP has made significant advances in this area with *NewWave*, which is central to *NewWave Office*. HP's object-oriented environment links data to its executable files, so all the user needs to do is click on a document, and up pops the file and the application. *NewWave* also features *agents*, which work like sophisticated macros to automate tasks across applications. IBM has made enhancements to Presentation Manager, but it still has work to do before its environment will be truly comprehensive and intuitive, says Judith Hurwitz, editor of *UNIX in the Office*, a newsletter published by Patricia Seybold's Office Computing Group in Boston.

**IBM's Vision**

IBM was the first on the scene with *OfficeVision*, which runs across all of Big Blue's operating systems. The PC LAN component, *OfficeVision/2 LAN Series*, runs under IBM's *OS/2 LAN Serv-*

## Lining Up Developers

Recognizing that the success of their products depends upon the availability of a critical mass of supporting third-party PC applications, IBM and HP are racing to get developers to commit to *Office Vision* and *NewWave Office*. But resources are spread pretty thin these days, and even when developers jump in early and announce support for such far-reaching environments, actual product availability is often years away.

When IBM introduced *OfficeVision* in May 1989, officials from both Lotus and Microsoft shared the platform, announcing plans to integrate their spreadsheets with the environment. In Lotus's case, this means a Presentation Manager version of the spreadsheet, *1-2-3/G*, which will access *OfficeVision* services, as well as a mainframe version. Microsoft is focusing on integrating its PM version of *Excel* into the *OfficeVision* environment.

WordPerfect Corporation of Orem, Utah, also plans to give its customers access to *OfficeVision* services through the PM version of its word processor. According to Chuck Middleton, director of OS/2 development, the product will be "*OfficeVision* aware" in the first PM release.

Besides those who have announced specific products, any PM developer is a candidate for moving its application into the *OfficeVision* environment. None of the developers will have to make good on promises of support any time soon, however, because the full application program interfaces (APIs), which are necessary to write for the environment, won't be available until release 2 begins shipping.

In its literature, HP lists more than 30 *NewWave* developers, most of which are *Windows* developers porting their applications. And that's where HP has encountered problems. Developers that aren't working on *Windows* products aren't likely to be doing anything in the *NewWave* environment either.

Microsoft pledged support for *NewWave* early on, and according to Rich Tong, product manager for *Excel*, the company will be moving its spreadsheet to *NewWave*. No availability dates have been announced, however. Adobe Systems of Mountain View, California, is also on the list of *NewWave* developers but, according to spokeswoman LaVon Collins, isn't ready to announce products.

Several *NewWave* products have hit the streets in recent months, however, including *Dynacomm* from Future Soft Engineering, Micrografx's *Graph Plus*, and *Ami Professional* from Samna. Lotus recently said it is creating a "shell" for 1-2-3 release 2.2 (HP created one for release 2.01) so NewWave users can access and update spreadsheets from within the environment. The add-on will continue to be bundled with *NewWave*, however, rather than sold as a separate product from Lotus.

One move that might increase interest in *NewWave* is HP's plan to offer a PM version of the environment. Mike Webb, *NewWave* developer manager, is working with PM developers and says that some who skipped *Windows* in favor of PM development may offer PM-*NewWave* versions of their applications. —*R. F.*

*er.* While some services are available for DOS users, the principal workstation is a 386 PS/2 equipped with OS/2 Extended Edition.

David Marshak, a Seybold analyst, describes IBM's approach as a "two-phase attack" in which it introduces the full LAN product in stages. With release 1, which began shipping last September, you get the E-mail system, an address book, a word processor, a telephone dialing utility, and a filing system. Release 2, scheduled for limited availability in August, adds decision support tools for data analysis and manipulation, group calendaring, and a composite word processor (which lets you add a graphic to a document but doesn't allow you to size or edit it). Release 2 also lets E-mail users grant someone else access to their messages. Built into the operating system are IBM's data base and communications managers.

**Riding the NewWave**

*NewWave Office* will be available on three platforms: MPE, the operating system for HP's minicomputers; UNIX; and OS/2, under *LAN Manager.*

*NewWave Office* brings some *NewWave* capabilities, such as object sharing, to the local area network. (*Objects*, in HP's parlance, refers to either data or executable files.) Other services include electronic mail (with connections to IBM and 3Com mail systems), access to remote data bases, and networkwide sharing of peripherals.

Although PCs equipped with *NewWave* are the preferred workstation for *NewWave Office*, standard DOS PCs, dumb terminals, and Macs are also supported. HP has pledged to port *NewWave* to both Presentation Manager and UNIX (using the Open Software Foundation's Motif graphical user interface), but it hasn't announced a release date for either version.

**Support for Entry-Level Systems**

One of the key differences between *OfficeVision* and *NewWave Office* is the level of support provided for entry-level PC users.

Because HP has selected *NewWave* as the workstation environment of choice, corporations can include all their 80286-based PCs in an integrated office environment. Add the company's commitment to moving *NewWave* to both PM and UNIX, and analysts say *NewWave Office* has a clear advantage over *OfficeVision* when it comes to offering companies a smooth migration path.

"*OfficeVision* really wants you to move to OS/2 and a 386 machine," says Seybold's Hurwitz, "but *NewWave Office* will let you start out with DOS PCs, using *NewWave* and *Windows.*"

"OfficeVision and NewWave Office tie together information systems and provide a common interface and access method."

PAUL GRAYSON, CEO, Micrografx

DANNY TURNER

Although *OfficeVision* supports DOS workstations, users and analysts agree that it's an inelegant implementation. "The DOS interface to *OfficeVision* hasn't impressed me," says SCG's Holmes. "There's very little there. You get E-mail, but it's awkward in comparison to the PM interface. I'm surprised they didn't choose *Windows.*"

IBM is not unaware of such criticism. The company is evaluating a variety of customer requests, and "the number one request is *OfficeVision* on *Windows,*" says Mike Early, manager of IBM's office systems market development. However, Big Blue has not committed to providing such a product.

**Targeting Big Systems**

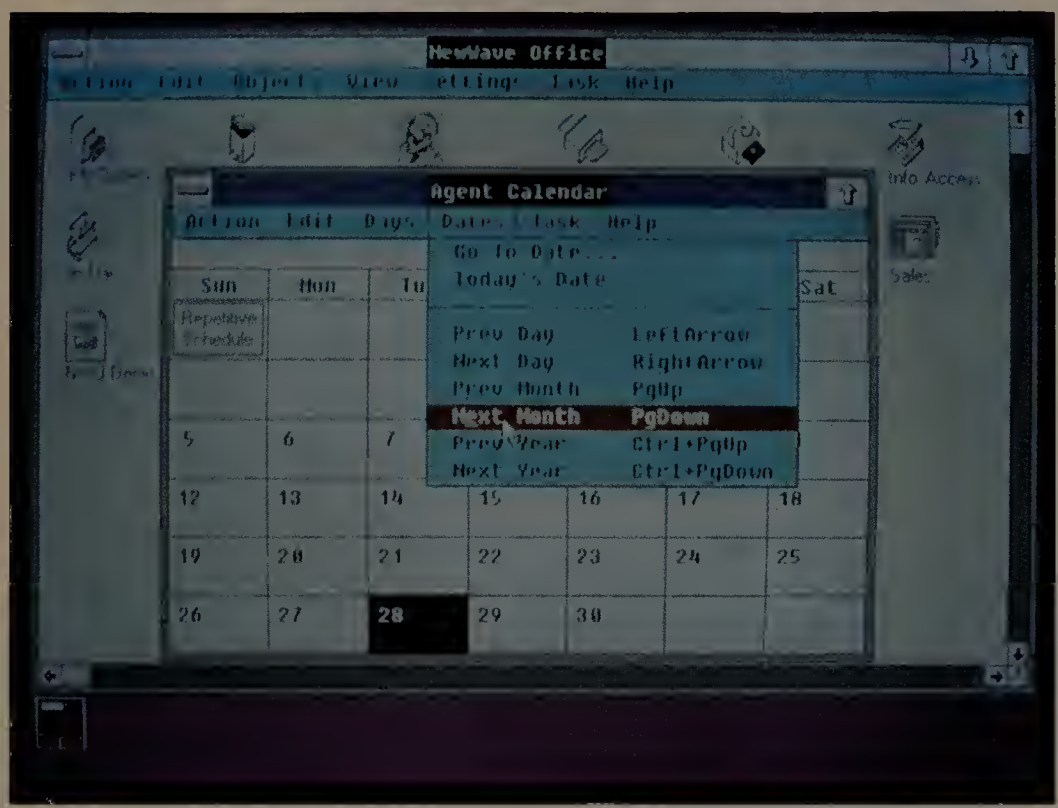
While individual users will focus on the interface enhancements these products offer, corporations will be most intrigued by the concept of linking systems of all sizes.

"*OfficeVision* and *NewWave Office* let companies tie together their information systems and provide a common interface and access method, regardless of platform or operating system," says Micrografx's Grayson, whose company is devel-

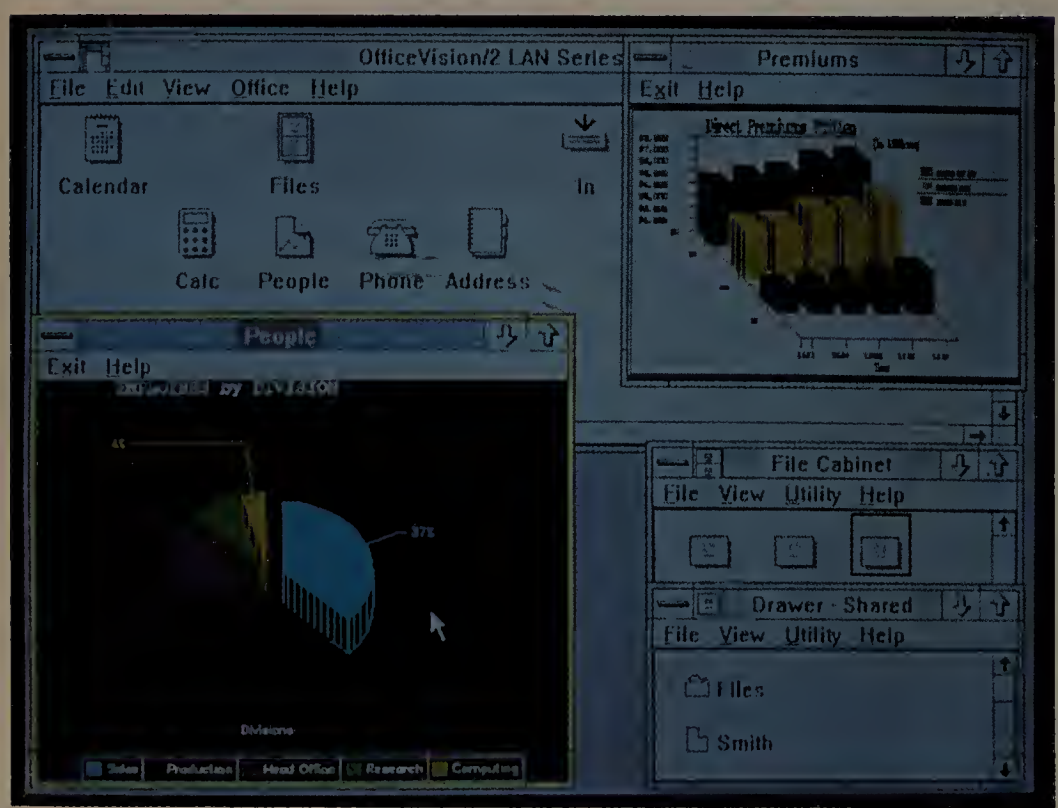
oping applications for both environments.

At the most fundamental level, though, *OfficeVision* is designed to link users of IBM's systems. HP takes the concept beyond its own minicomputers and Vectra PCs, both recognizing and supporting the multivendor environment that exists in many corporations today. *OfficeVision* "takes customers down a proprietary lock-in route to IBM; ours is clearly not a lock-in route," asserts Ruann Ernst, director of marketing for HP's information systems group.

But IBM is beginning to recognize the need to hook into other systems, adds Seybold's Hurwitz.




NewWave's agent capabilities will allow users to automate routine tasks, such as extracting sales figures from a data base and pulling them into a monthly report.




With the file cabinet facility in OfficeVision, users can store files locally or on a network server, then use the Library utility to search, file, copy, delete, or update documents.

"IBM has always looked upon itself as an island, but even it is realizing it has to be more open," she says, pointing to a deal with SoftSwitch that will allow companies to exchange E-mail between *OfficeVision* and other office systems.

**Barriers to Implementation**

The capabilities afforded by *NewWave Office* and *OfficeVision* do not come cheap, however. Both demand a substantial investment in hardware, and many companies may balk at the depth of the commitment required and the thought of upgrading PCs to fit into the complete *OfficeVision* or *NewWave Office* environment.

"We're talking about a tremendous upgrade in either case," says Seybold's Marshak. He estimates that *OfficeVision*'s OS/2 Extended Edition workstation requires at least 7MB of memory and a 386 system. The *NewWave* workstation is slightly less demanding but still needs at least 3MB of RAM.

Another limiting factor is that both *OfficeVision* and *NewWave Office* are based on immature platforms. Neither product is complete yet, and neither IBM nor HP can boast a comprehensive set of PC software applications to hook into their respective environments.

Pioneers are likely to find themselves unwitting beta testers who have to suffer frequent bug fixes and updates. Given these realities, even companies with significant investments in IBM or HP hardware—the target group for both new environments—will move cautiously into either of the environments. And reaching beyond these core customers may be difficult for both companies, given the investment required.

But while implementation will be slow going, the two products are worth close attention. Although only in their infancy, *NewWave Office* and *OfficeVision* provide a first glimpse of the way many PC users will compute and share information in the future. ●

*Roberta Furger is an associate editor for* PC World.

## Where to Buy

**NewWave Office**
Hewlett-Packard
Santa Clara Information Systems Division
3410 Central Expwy.
Santa Clara, CA 95051
408/749-9500
**Reader service no. 680**

**OfficeVision**
IBM
IBM Application Solutions Division
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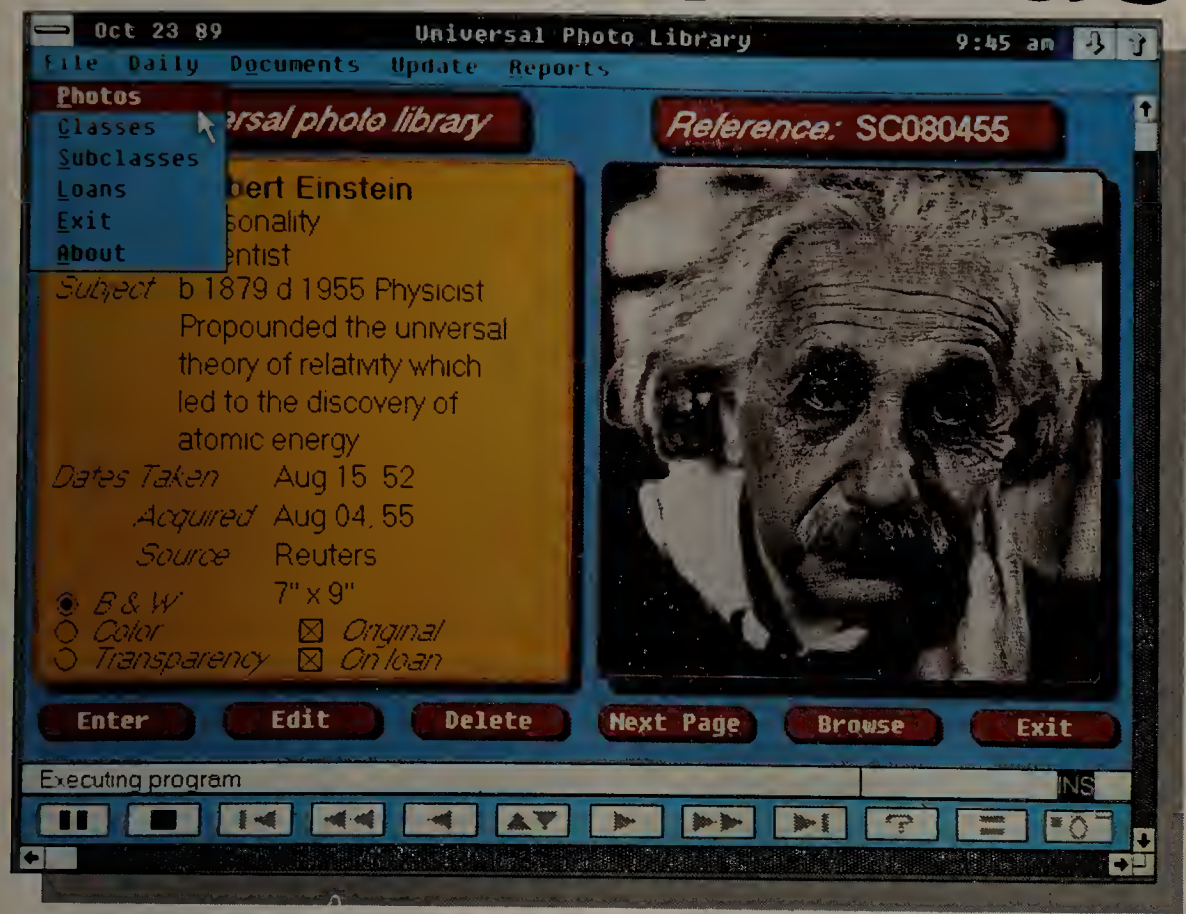
Roanoke, TX 76299-0001
800/426-3333 (for information on nearest IBM branch office)
**Reader service no. 681**

# Pure GUInius

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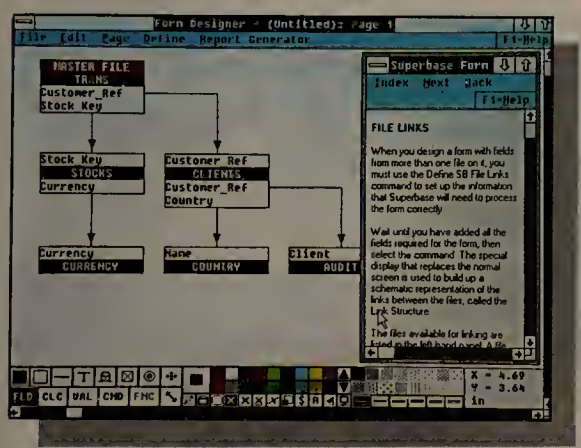


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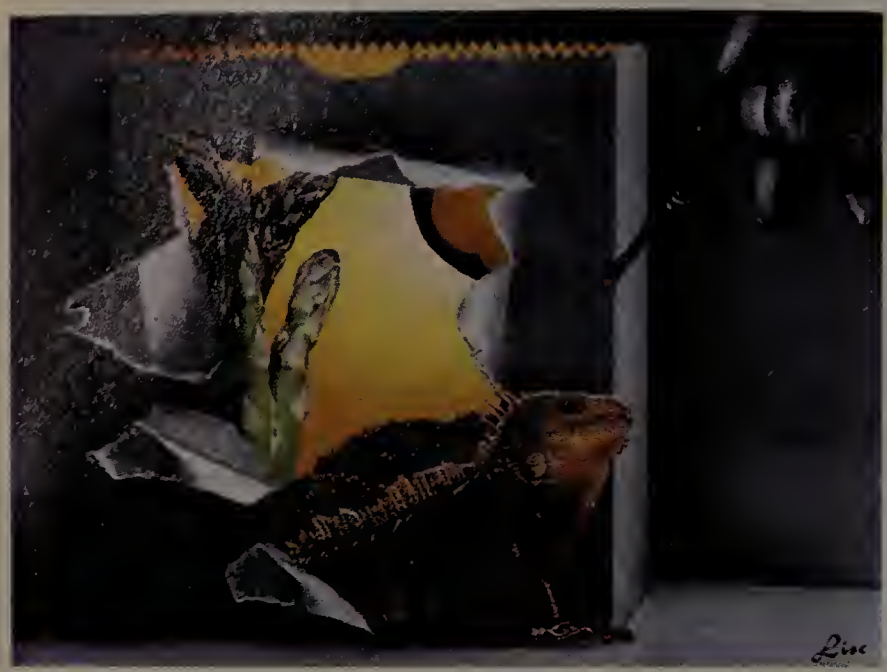
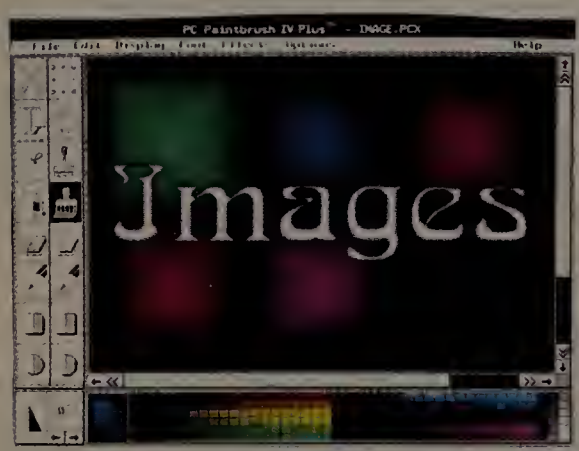
# PC Paintbrush IV Plus



Now you can scan, create, edit and dramatically enhance images. All with one program: the new PC Paintbrush IV Plus.™ It brings you all the power of ZSoft's PC Paintbrush IV™ – and builds in complete scanner control, large image support and other powerful pluses.




*Dress up your documents and presentations with gradient color backgrounds, impressive text effects, and automatic patterns.*

**Scanning power.**

Control your scanner from *within* PC Paintbrush IV Plus. Scan and edit full-page, black-and-white, gray-scale and color images with a 640K system. Rescale images (25 to 400 percent). And with the unique pre-scan feature, simply frame the precise area you want, then scan *only* that area at high resolution.

**Image enhancement.**

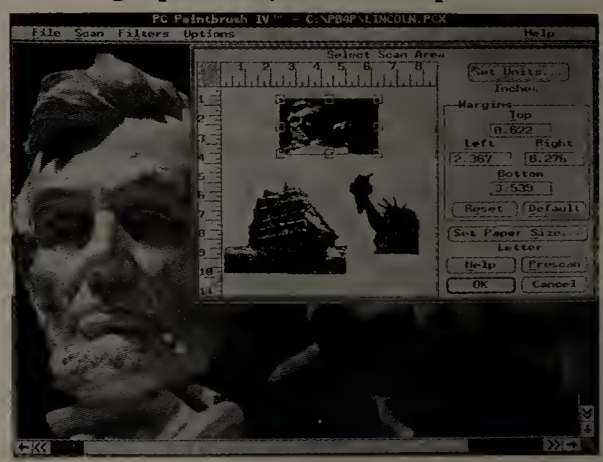
The new PC Paintbrush IV Plus is packed with innovations. New retouching features let you blend, lighten, darken, adjust contrast, change tints and blur portions of any image. New image processing functions let you automatically correct poor originals. It's like having a photo lab in your computer!

**Persuasive presentations.**

For compelling overheads, slides and documents, choose from a huge arsenal of features. For example, use the "tiling" feature to create 3-D effects and intricate textures. Automatically shadow, outline and graduate text for dynamic effects. Load and save PCX and TIFF images. Capture screens. You can even overlay two images.

**Intuitive interface.**

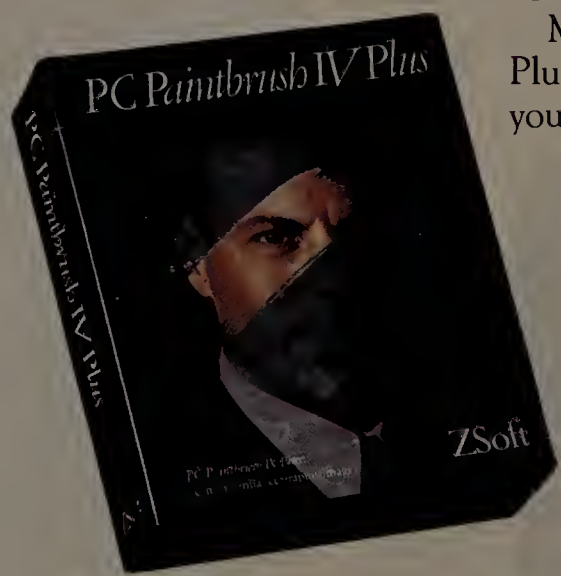
PC Paintbrush IV Plus is packed with convenience: Pull-down menus, customizable screen layouts, graphically labeled options,




*Complete control of your scanner. . . select resolution, halftone pattern, brightness, contrast and rescale from 25 to 400 percent.*

multiple levels of context-sensitive help, and a combination of mouse control and keyboard accelerators.

Move up to PC Paintbrush IV Plus. It's the perfect finish to what your scanner started.




ZSoft
CORPORATION

450 Franklin Road / Suite 100
Marietta, Georgia 30067
(404) 428-0008
FAX: (404) 427-1150

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To update, send $50 plus $4.90 shipping and handling and your original PC Paintbrush Plus program disk to: ZSoft Update, Dept. WX, P.O. Box 8123, San Francisco, CA 94128. Specify 5.25" or 3.5" disk. CA (6%) and TX (7.5%) residents, add sales tax. Canadian customers, add $15.90 for air shipping. Outside N. America, add $15.90 for surface shipping or $24.90 via air. Payments must be in U.S. funds by check, money order, VISA, MasterCard or American Express.

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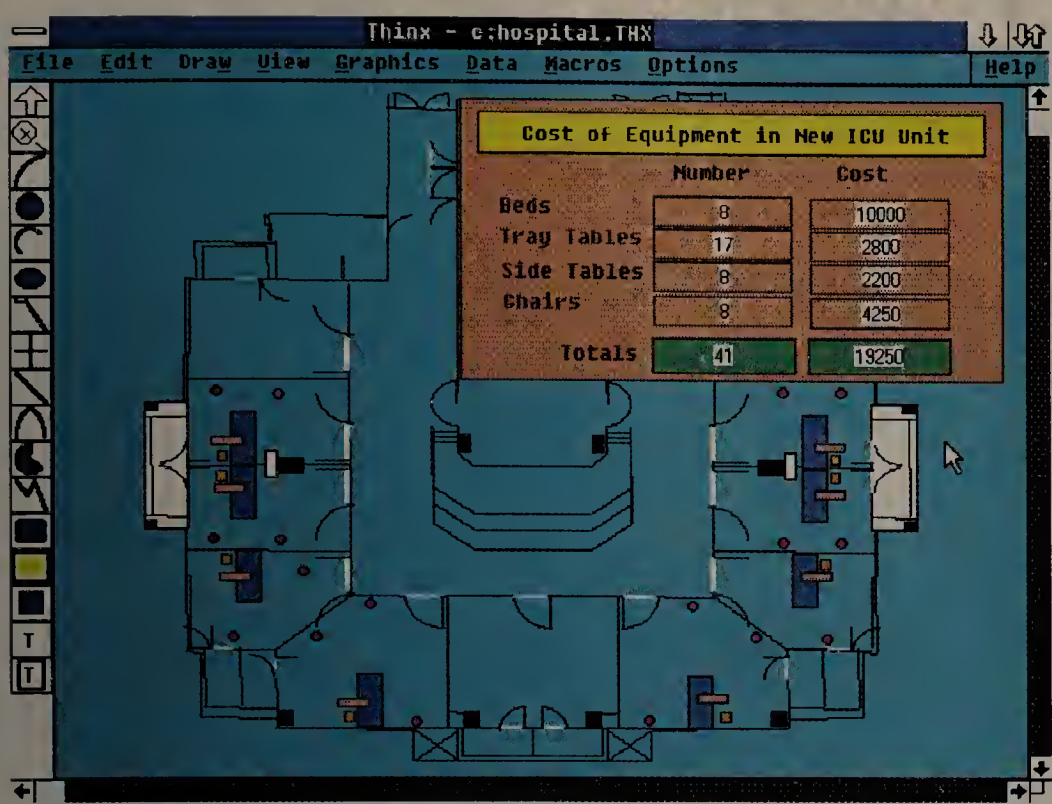


Thinx lets you assign values and attributes to objects, then do "what-if" analysis by manipulating those objects—in this case, furniture in a floor plan.

# Point and Click What-If

Graphics programs are a dime a dozen in the Windows world. But what about an intelligent graphics package?

**John Walkenbach**

A revolution is brewing, and Bell Atlantic's *Thinx* just might lead the charge. Imagine playing out business scenarios by manipulating images—instead of rows and columns or fields and records—and displaying your conclusions with presentation quality graphics.

That's the idea behind *Thinx*, an unlikely creation that blends *Micrografx Draw*–like tools with elements from spreadsheets and data management programs. You start by drawing objects that represent entities, such as employees. Each object can be assigned such attributes as name, salary, and department, which you define in data base record–style forms. To interrelate objects, you build formulas in a form by clicking on the objects and inserting functions such as SUM, AVG, and ABS. With a few mouse rolls, you can then move, copy, group, and otherwise associate objects to quickly see the impact of different configurations.

*Thinx*'s marriage of image and data will appeal to a wide audience—especially those who hate fiddling with spreadsheets and data bases. For instance, a designer could arrange office furniture in a floor plan and get instant feedback on the cost of a particular layout. A hotel manager could assign attributes to hotel beds—cost, size, date acquired, and so on—and easily determine which rooms have king-sized beds that are more than three years old, calculate the cost of replacing them, and even ask *Thinx* to pinpoint their locations. *Thinx* would also be perfect for creating a dynamic organization chart to assess the budgetary or resource impact of personnel reassignments or cutbacks.

Of course, *Thinx* can't provide the kind of sophisticated financial analysis *Excel* can. Output is limited to totals popped into an on-screen box or printed in a simple tabular report. But no other package lets you visibly manipulate data and assumptions with just a few clicks of a mouse.

Building complex *Thinx* models, however, can be a major undertaking. Fortunately, you can hot link *Thinx* data to *Excel* via Dynamic Data Exchange, or tap *1-2-3* or *dBASE* files. And don't fret if you're not an artist: You can use vector-based clip art and images created with other popular draw programs, or you can incorporate objects from other *Thinx* projects. The program's built-in macro processor also automates various chores.

Keep in mind that this preview is only a sketch. *Thinx* will probably be significantly enhanced by the time the $495 package ships in mid-1990. More features and interface changes are in the offing, including a *Windows 3.0*–specific version. But if only part of what's promised is delivered, *Thinx* could be one of the most innovative products of the year. ●

*John Walkenbach is market research manager for a leading savings and loan based in Southern California.*

WINDOWS

THINX CAN'T PROVIDE SOPHISTICATED FINANCIAL ANALYSIS, BUT NO OTHER PACKAGE LETS YOU VISIBLY MANIPULATE DATA AND ASSUMPTIONS.

**Thinx**
Bell Atlantic Corp.
13100 Columbia Pike #D37
Silver Spring, MD 20904
800/552-2257
**Reader service no. 621**

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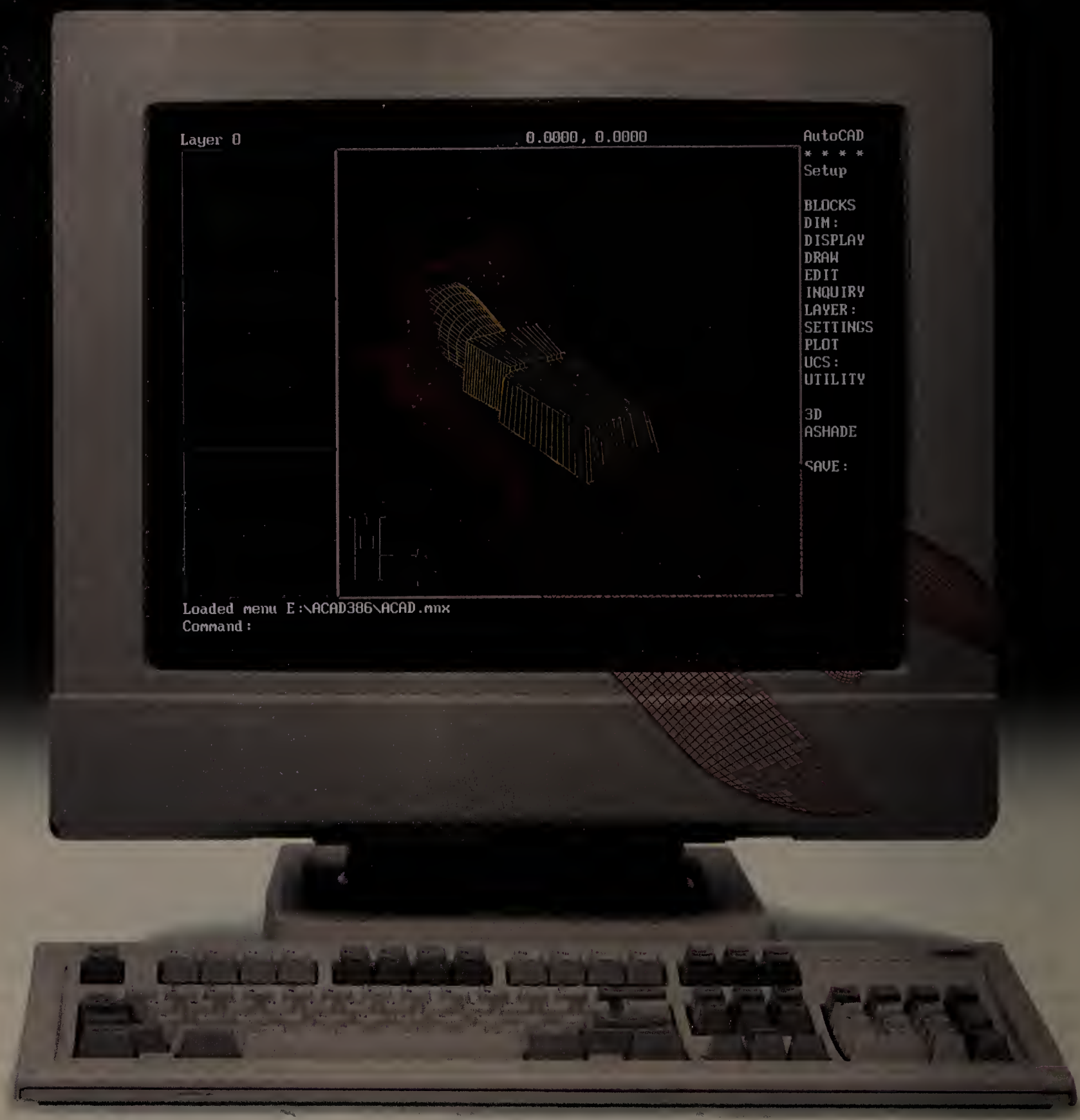


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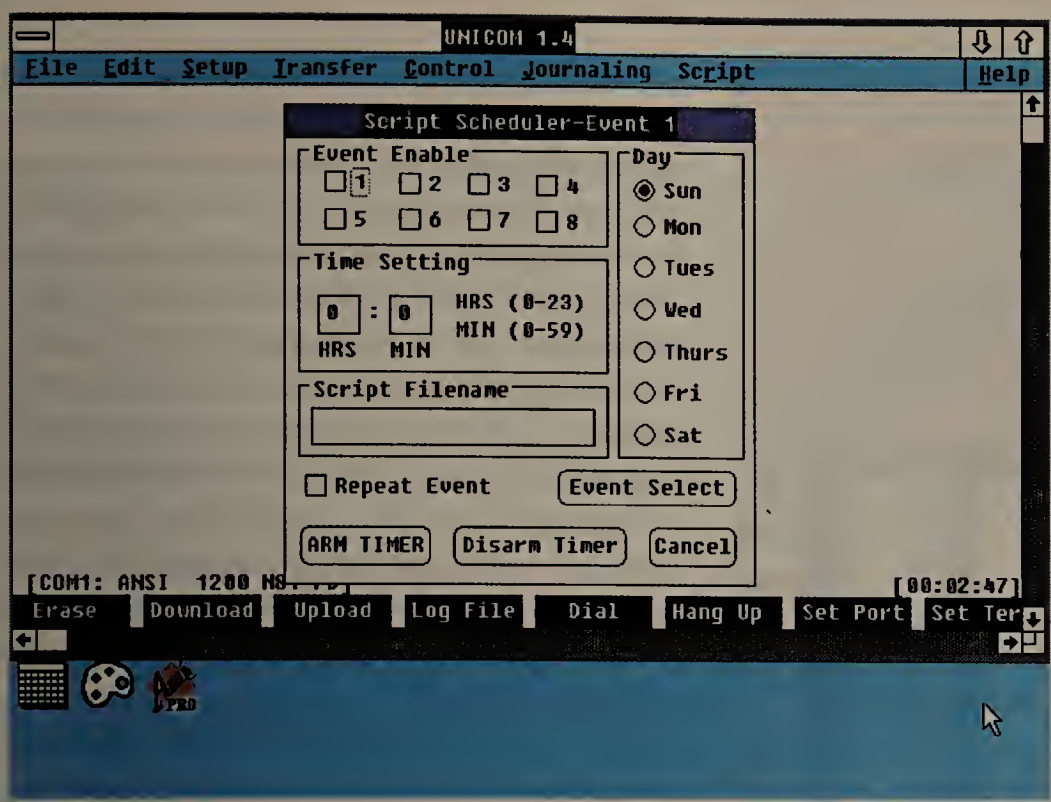



Using Unicom 1.4's enhanced script language, you can easily set up unattended script sessions to send and receive files while you're away from your PC.

# A Procomm for Windows?

One of the first shareware communications programs for Windows promises Procomm-like talents for a puny price.

**Judy Getts**

Wanted: a solid shareware communications program for *Windows*—a point-and-click *Procomm*. Data Graphics' *Unicom 1.4*, which should be available by the time you read this, shows signs of meeting the qualifications.

*Unicom* can't match commercial packages such as *Crosstalk for Windows*—its host mode is weak, and it lacks a learn mode, a capture buffer, and Dynamic Data Exchange support. But based on the prerelease *Unicom 1.4* examined by *PC World*, the program seems promising. It features an elegant dialing directory and extensive error-checking protocols, handles 300-bps to 19,200-bps communications, and boasts an enhanced script language. Another big plus: You can download the program from CompuServe and other on-line services for free or get a manual, a disk, and unlimited support from the company for a mere $60.

*Unicom*'s interface is surprisingly slick. The pulldown menus are well organized, and you can click on-screen buttons to perform common tasks such as dialing, downloading, and hanging up. On-line help is only a mouse click away.

The superb central dialing directory is similar to *Procomm Plus*'s. It offers queue dialing options and displays names, numbers, parameters, and script files. It's easy to set up an entry—click a command and fill in the dialog box. Global defaults encompass everything from flow control to pacing, and you can easily modify them from a single menu.

You'll have to write your own log-on scripts, however—none are included, and there's no learn mode to record log-ons. Fortunately, *Unicom*'s new Pascal-like script language rivals *Procomm Plus*'s. It provides 35 easy-to-use commands that let you automate on-line tasks, size and move windows, and even redesign dialog boxes. A trace mode eases debugging.

*Unicom*'s transfer protocol list matches commercial offerings: You get XMODEM, YMODEM, ZMODEM, Kermit, CompuServe B, and Quick B. However, terminal emulations are limited to ANSI-BBS, VT 52, and TTY. *Unicom*'s remote host mode is limited, too. There's no chat mode, and security consists of a single password shared by all callers—especially risky since callers have full access to your system.

*Unicom 1.4*'s status line tells you when it's connected but not when it's downloading ASCII text or printing. Status displays for protocol transfers are much better—a box shows progress with a moving bar and other indicators. Background file transfers are much improved over *1.3*'s: Although the screen flickers a little, foreground and background application performance don't appear to slow significantly.

*Unicom 1.4* brims with promise. All you'll need is DOS 2.1, *Windows 2.03*, and a spare 80K of RAM. (A *Windows 3.0*–specific version will be released before year-end.) If a host mode isn't important, *Unicom* could be that solid—and cheap—shareware communicator *Windows* users have been waiting for. ●

*Judy Getts is a contributing editor for* PC World.

**Unicom 1.4**
Data Graphics
7524 35th Ave. SW #N403
Seattle, WA 98126
206/932-8871
**Reader service no. 622**

UNICOM'S PULLDOWN MENUS ARE WELL ORGANIZED, AND YOU CAN CLICK ON-SCREEN BUTTONS TO PERFORM COMMON TASKS SUCH AS DIALING, DOWNLOADING, AND HANGING UP.

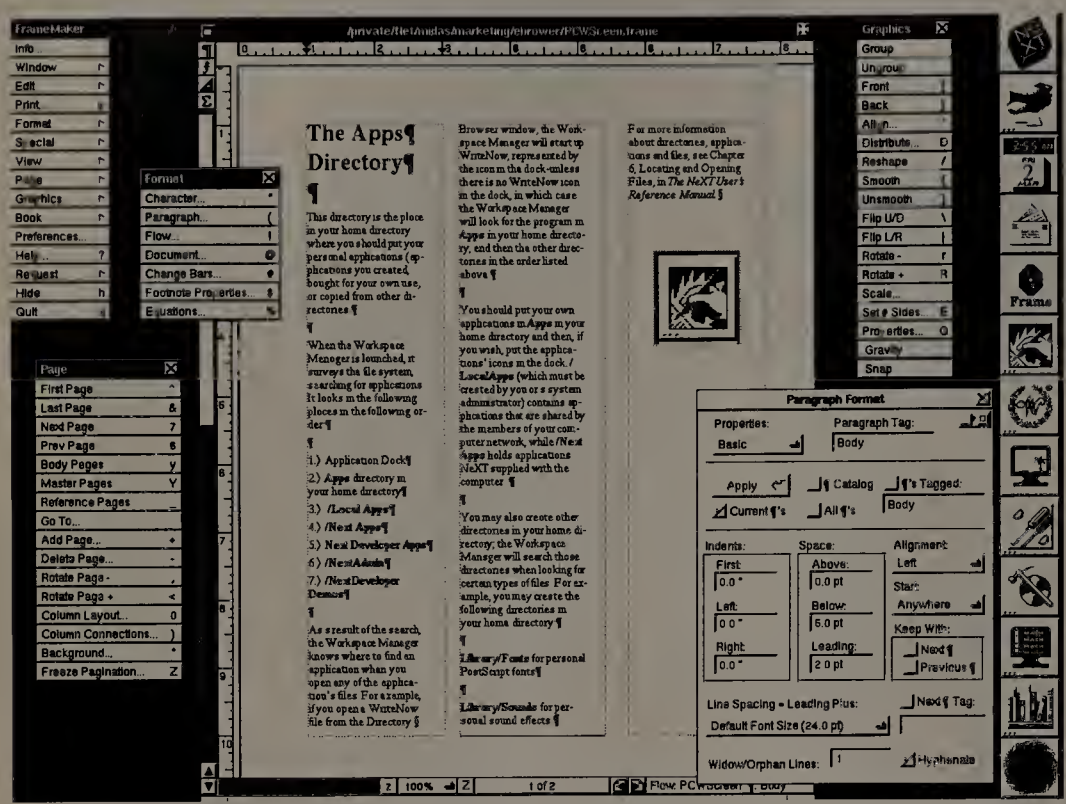
# FRAMEMAKER 2.0

## Desktop publisher for Next system

**PROS:** Near WYSIWYG display, powerful long-document features, searches for fonts and tags, dynamic cross-references to multiple documents

**Review**

**CONS:** Complex user interface, slow printing, limited data import




FrameMaker 2.0 (and the Next's NextStep interface) lets you open multiple windows and dialog boxes and place them wherever they're handiest.

**Michael Goodwin**

When a powerful new computer like the Next appears on the scene, everyone asks, What can we do that we couldn't do before? Will new programs dazzle or disappoint us?

One of the first dazzlers to debut on the Next is *FrameMaker 2.0*. Previously available only for Sun workstations, this advanced desktop publishing package takes full advantage of the Next's 8MB of standard RAM and multithreaded operating system (OS) to deliver fleet performance and a bulging grab bag of features. Moreover, *FrameMaker*'s use of the Next's Display PostScript and PostScript printer gets as close to true WYSIWIG as anyone could wish—although printing is a bit slow.

But it's *FrameMaker*'s use of the Next's multitasking OS that makes it a publishing powerhouse, especially for long documents. You can open multiple chapters and move text, paragraph styles, master-page layouts, and so on between them. Multiple chapter files can be combined into a book with impressive ease—and pages, figures, footnotes, and indexes can be renumbered automatically. Best of all, unlike *Ventura Publisher*, *FrameMaker* saves the original chapter files with their original numbering just in case you change your mind. Variable text can also be inserted in footnotes, headers, or body text, so you can update data (such as part numbers) in a flash.

You can run other applications at the same time you're using *FrameMaker* and employ a built-in screen capture utility to pull text and graphics into your document. Pulldown, "breakaway" menus can be moved anywhere on screen (or even off screen) to clear space for your document. And with Next's digital signal processor, you can even attach spoken comments to documents—audio Post-it notes that remind your co-workers to take action.

Like *Ventura Publisher*, *FrameMaker 2.0* uses a frame/master-page approach that depends on style sheets, paragraph tags, and master pages to simplify page layout and design. Both programs provide drawing tools and let you adjust leading, kerning, text flow, graphics handling, and so on—but in *FrameMaker*, almost every feature offers greater control and is easier to use.

Consider the two programs side by side. *Ventura* limits you to four basic views (reduced, normal, enlarged, and facing pages), while *FrameMaker* lets you set the display anywhere between 25 and 1600 percent magnification—in 1 percent increments. (The pages are editable at any size.) Moreover, thanks to the Next's sharp 16-inch MegaPixel display, you can read normal text even when page display is cranked down to well below 80 percent.

*Ventura* doesn't offer search and replace or a spelling checker. *FrameMaker* can search for fonts, paragraph tags, headers, footers, footnotes, cross-references, variables, and markers as well as text—and replace many of them. *FrameMaker*'s full-featured spelling checker pinpoints not only misspellings and repeated words but nonstandard hyphenation, extra spaces, and unusual capitalization. These are key features if you're up against a tight deadline and need to make last-minute changes.

*Ventura* lets you rotate text; with *FrameMaker*

FRAMEMAKER GETS AS CLOSE TO WYSIWYG AS ANYONE COULD WISH.

both text and graphics can be flipped, reversed, and rotated (but only in 90-degree increments). You can switch from portrait to landscape mode in *FrameMaker* with a single click and print both orientations on the same page.

If you need to match the lengths of two adjacent columns of text, *Ventura* forces you to adjust the leading between lines by entering numbers in a table and viewing the results; with *FrameMaker*, you simply click *Feathering*, and column length adjusts automatically.

*Ventura* lets you cross-reference text only in the same chapter; *FrameMaker* allows you to link cross-references across chapters or unrelated files. After you edit referenced documents, you simply run the update feature to correct all page references.

*FrameMaker* accepts ASCII text and formatted DCA, *WordStar*, *Word*, and *MacWrite* files, among others. However, until these programs run on the Next, you'll have to import text files via the Next's serial port—not an appealing prospect. Luckily, creating text with *FrameMaker* is so easy that many people may use *FrameMaker* for word processing as well as desktop publishing. Getting additional PostScript fonts won't be a pain: Adobe sells an optical disk with eight fonts for $495.

Scientists and technical writers will be pleased to discover that *FrameMaker* includes a powerful Equations Palette that lets you create scientific notation by clicking on the symbols you need. There's even a fairly sophisticated scientific calculator so you can check your work and generate examples. The recently repackaged *Ventura* offers an equation generator too, but it's a lot harder to use.

Of course, *FrameMaker* isn't perfect. There are minor but annoying display bugs, and on one occasion the program simply refused to import a graphics file. And though *FrameMaker*'s menu system is relatively intuitive, there are so many menus, submenus, and options that it's easy to get lost. Unfortunately, the keyboard shortcuts are about as mnemonic as *WordStar*'s keyboard commands, so most users will stick with the menus.

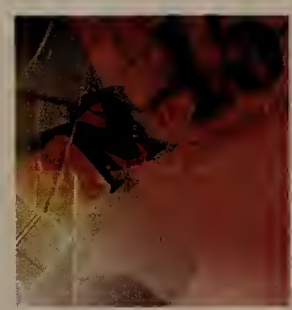
Another glitch: Sometimes when you issue a *FrameMaker* command, nothing happens. There's no disk-shaped cursor, no 'Please wait' message, and no screen activity. Sometimes the command executes after a while; other times you could wait forever. While this is typical of the Next, *FrameMaker* could use a few 'Busy' messages.

The biggest drawback is that the Next can't easily reach out and touch the outside world. Since the system isn't DOS, OS/2, or Mac compatible, you have to import data, TIFF images, and so on, via the Next's serial port—or generate what you need with another Next-based program.

FRAMEMAKER ALLOWS YOU TO LINK CROSS-REFERENCES ACROSS CHAPTERS OR UNRELATED FILES. AFTER YOU EDIT REFERENCED DOCUMENTS, YOU SIMPLY RUN THE UPDATE FEATURE TO CORRECT ALL PAGE REFERENCES.

The other major sticking point: Using *FrameMaker* means shelling out close to $14,000 for a Next computer with its matching 400-dpi printer. If desktop publishing is your company's main source of income—or its biggest chore—this may well be a justifiable expenditure; *FrameMaker* is one of the most powerful and friendly desktop publishing programs around, and the Next is a network-ready machine perfect for work-group publishing. However, for offices where DTP is a sometime thing and budget entries for expensive new hardware are closely questioned, it makes sense to stick with *Ventura* or *PageMaker*. Don't forget that future *Windows* and OS/2 versions of these stalwarts may provide many Next-like goodies for a fraction of the cost. ●

*Michael Goodwin is an associate editor for* PC World.



WINDOWS

## Where to Buy

**FrameMaker 2.0**
Frame Technology Corp.
1010 Rincon Cir.
San Jose, CA 95131
408/433-3311
LIST PRICE: $999 per workstation
REQUIREMENTS: 4MB of RAM (8MB recommended), 30MB of free disk space, Next computer
TECHNICAL SUPPORT: unlimited, toll-free number, M–F 6–6
OTHER SUPPORT: company BBS
**Reader service no. 602**

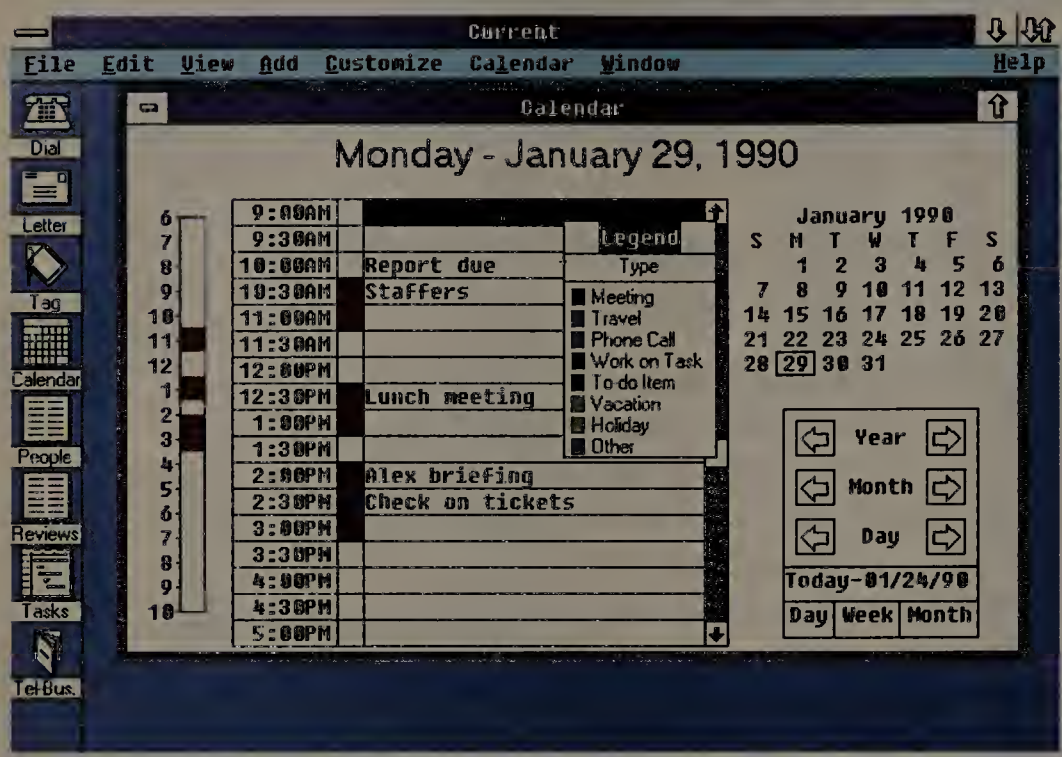
# CURRENT 1.0

**Review**

### Personal information manager

PROS: Customizable data entry forms, views, and interface; links categories; capable calendar

CONS: Hard to learn, obtuse manual, alarms can't be set selectively, no DDE support




Current's daily agenda is easy to cruise through with a mouse. What's more, the calendar's color coding makes it a snap to see not only open blocks of time but what types of activity your filled blocks are filled with. Double-clicking on any entry brings up the full details on that appointment.

**Patrick Marshall**

Personal information managers (PIMs) seem to be two steps behind the times. Some PIMs make you shoehorn data into electronic replicas of traditional desktop tools: Appointments must be entered and viewed in a calendar, phone numbers in a phone book, and so on. Others, like *Lotus Agenda*, are quasi-programming languages that force you to create practically every data structure such as a calendar. The former programs are easy to use but rather limited; the latter are so flexible, you can spend weeks making them work.

*Current*, from IBM, aims for the middle ground. Like *Info-XL*, *Current*'s home base is a capable calendar complete with alarms and cyclical scheduling, complemented by a nifty phone book and a to-do list. *Current* also comes with an auto-dialer that can dial a number in any module, a mail-merge function that can use document templates, and a simple task/project manager with a Gantt chart. Yet like *Agenda*, *GrandView*, and other unstructured PIMs, *Current* doesn't lock data into one mold. You enter data once, assign it to a category (such as Expense or Person), and then display it in a variety of *views*. Tasks, for example, can be listed, viewed in phone book form, or represented in a Gantt chart.

*Current*'s edge, however, is its malleability. If you don't like the supplied categories and views, you can create your own. Another big edge: You can link categories so that data is accessible from more than one place. For example, you could connect a customer report to a sales rep list, so that clicking the Company field in the report popped up details about the rep's success with that client. *Current* lets you use the same cross-referencing technique to post data automatically in another category. You can create a custom report that filters data from a given category and print any on-screen view. To gussy up reports, you can set margins and pick fonts and attributes from menus.

The final edge is the *Windows* interface. Along with the standard pulldown menus, you get an icon bar that lists views, forms, and basic functions such as dialing and printing. You can add custom forms and views to the icon bar or to a pulldown menu. Clicking an icon instantly displays the form or view; naturally, you can keep a number of items on screen at once and flip between them with a mouse click.

Just keep in mind that if you're new to data management concepts, mastering *Current* isn't a stroll in the park. You won't struggle with *dBASE*-type problems—*Current* feels like an end-user programming tool such as *HyperCard*. But you will have to set up the fields in a new category and link categories. Things aren't made any easier by over 700 pages of dense documentation that misses the forest for the trees. A quick-start booklet that supplied a solid conceptual overview would be a big plus. However, *Current*'s context-sensitive help system is a boon. Select *Help*, pick the bothersome command, and *Current* will supply ample guidance.

Still, creating a new *Current* category is relatively simple. You call up a blank form and pick from as many as 13 field types, such as text, date, numeric, currency, telephone number, calculated, and image (PCX or TIFF), and add radio buttons that perform simple functions.

However, stringing a line between two categories isn't for novices. You must first connect the categories, then link items in the categories to one another. The first part involves establishing *two* links that tell *Current* that category A (such as Tasks) is linked to B (Person) and that B is linked to A. A line will appear in each category's data form

that represents a window into the other category.

Once that's done, you link items. You can create an automatic rule, for example, that says, "Every time John Smith appears in the Contact field of a record in the Task category, assign that task to John Smith." Load John Smith's record in the Person category, and you'll see every task assigned to him. Double-click on any of Smith's listed tasks, and the task record is displayed.

If you want to create exceptions to the rule, you must make the link manually: Load the Task category, display the desired record, select the Assign Task menu option, and then choose the person from the displayed list. Either way, forging links is relatively complicated.

Of course, you don't have to define everything in *Current*. The calendar is relatively powerful: You can enter dates in a wide variety of formats, including next Thursday, next month, or the third Friday of the current month. *Current* also allows cyclical scheduling, although this feature is poorly documented and underpowered. You can enter a recurring appointment for, say, every Monday between two specified dates. But *Current* doesn't recognize "every second Tuesday of the month." *Current* also offers an alarm feature, although the user manual never mentions it. You can set alarms to go off before appointments, and the alarms will pop up over other *Windows* applications. But unlike with other PIMs, you can't set the alarms to go off only for selected appointments; if the alarm function is on, it rings before *every* appointment.

The other prefab *Current* categories and views are pretty bare bones. The Project category has a field for project name and description and comes with preset connections to the Person, Task, Travel Expense, and Company categories. The Task category will record a description and the start and end dates for a task, and it provides three radio buttons that you click to note if the task is planned, in progress, or complete. Select the Gantt chart view, and the tasks are instantly displayed in graphical fashion.

The phone book view resembles its printed equivalent right down to the tabbed pages, and it can also log phone calls. The Person category that it draws on can store comments and even salutations. Better still, highlight a name and click the Letter icon on the icon bar, and the name, address, and salutation are automatically entered into a letter template for you. *Current* can import or export data in *Excel*, *dBASE*, ASCII, and DIF formats.

*Current* still has a few kinks, however. The program offers a serviceable dialer, for example, but it can't recognize modems attached to COM2. And *Current*'s outliner is so crude that it's not worth loading. *Current* also doesn't support *Windows*' Dynamic Data Exchange (DDE) facility, which would be handy for keeping figures updated via an *Excel* worksheet. Users will also be annoyed to discover that a category is limited to 2000 records—thus the phone book would top out at 2000 names.

CURRENT'S EDGE IS ITS MALLEABILITY. IF YOU DON'T LIKE THE SUPPLIED CATEGORIES AND VIEWS, YOU CAN CREATE YOUR OWN. ANOTHER BIG EDGE: YOU CAN LINK CATEGORIES SO THAT DATA IS ACCESSIBLE FROM MORE THAN ONE PLACE.

Despite the steep learning curve and various glitches, *Current* is an impressive program that's flexible without being formless. If all you need is a simple scheduler or phone log, *Current* is too complex and too expensive. But if you use *Windows* and need to customize your electronic desktop—and you aren't afraid of a little programming—*Current* is well worth the money. ●

*Patrick Marshall writes for* Congressional Quarterly's Editorial Research Reports *in Washington, D.C.*

## Where to Buy

**Current 1.0**
IBM Desktop Software
472 Wheelers Farms Rd.
Milford, CT 06460
800/426-7699, 203/783-7000
LIST PRICE: $395
REQUIREMENTS: 640K, hard disk, DOS 3.3 or later version, Windows 2.03 or later version; Windows run-time included
TECHNICAL SUPPORT: unlimited, one year, toll number, M–F 8–8
OTHER SUPPORT: none
**Reader service no. 624**

# AUTOCAD RELEASE 10 FOR OS/2

**CAD package**

PROS: Powerful 2-D drafting, competent 3-D wireframe and surface modeling, supports multitasking and the Applications Development System

CONS: Painfully slow, limited peripheral support

**Review**

Under Presentation Manager, AutoCAD looks and operates much the same as the DOS version. But it's much slower.

**Christopher James DeLucchi**

*AutoCAD* is still far and away the most popular CAD package. It's the strongest 2-D drafting package for the PC, fortified by hundreds of third-party vertical applications. The program also runs on many platforms, from DOS machines to Macintoshes to Sun, Apollo, and DEC workstations.

With *AutoCAD* release 10 for OS/2, Autodesk adds the ninth environment to the list. The package runs under Presentation Manager (PM) but maintains the same basic feel across all platforms. You also benefit from the major improvement in all versions of release 10: true 3-D wireframe and surface modeling.

The problem with release 10 for OS/2 is that it's slow—25 percent slower than the DOS version (under UNIX, the program is 40 percent *faster* than the DOS version). CAD users crave performance (even the fastest system takes time to update a complex drawing), so this failing may stop many from even considering the OS/2 version.

OS/2's poor performance is partly offset by multitasking. Running multiple *AutoCAD* sessions can eliminate time-consuming file loading when you work with multiple drawings. In addition, you can run a sluggish task (such as plotting) in the background while working on another task in the foreground.

The exceptional feature offered by release 10 for OS/2 is the Applications Development System (ADS). ADS is a high-level programming environment that will be included in all versions of release 11 except the standard DOS version. Very few *AutoCAD* users will be writing C programs, but for developers, ADS is a must-have.

Like all versions except the DOS version, release 10 for OS/2 has a limited selection of drivers for digitizers, plotters, printers, and video displays. PM itself adds little to the mix; few hardware vendors are supplying high-resolution drivers for PM.

Typical DOS-based *AutoCAD* systems already have enough RAM, display resolution, and hard disk capacity to run release 10 for OS/2. But why suffer the speed penalty? If you want multitasking, you'd be better off switching to the faster SCO UNIX version, which has similar hardware requirements and the excellent Open Desktop windowing interface. Fortunately, if your needs change, Autodesk's enlightened upgrade policy lets you switch to any other environment for a reasonable fee. ●

*Christopher James DeLucchi is the author of* The AutoCAD Cookbook *series (John Wiley, New York, 1989) and the chairperson of the AutoCAD Users Group of San Diego.*

AUTOCAD RELEASE 10 FOR OS/2 MAINTAINS THE SAME BASIC FEEL.

## Where to Buy

**AutoCAD release 10 for OS/2**
Autodesk Inc.
2320 Marinship Way
Sausalito, CA 94965
415/332-2344
LIST PRICE: $3000
REQUIREMENTS: 286, 386, or 486 system; math coprocessor; 4MB RAM (6MB recommended); OS/2 1.1 or later version; high-density floppy drive, hard disk; PM-compatible video board; pointing device
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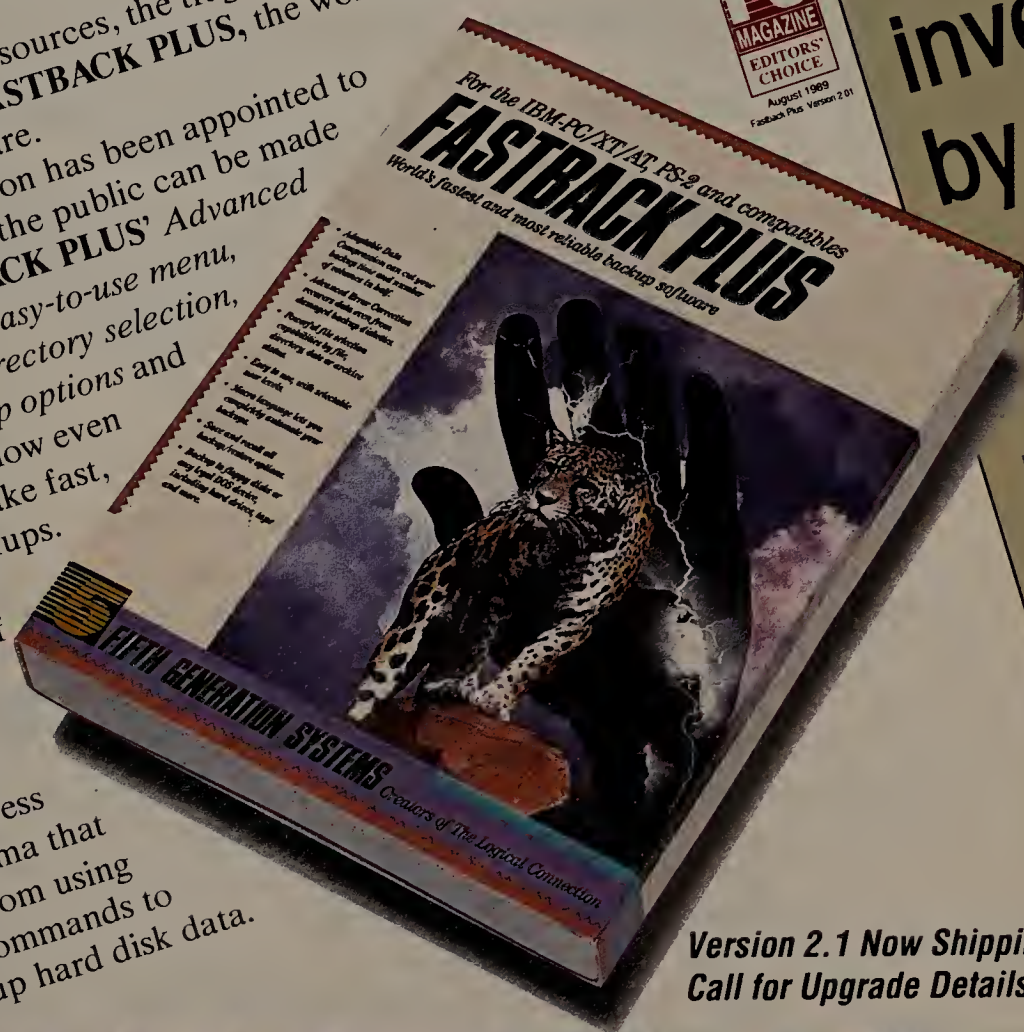


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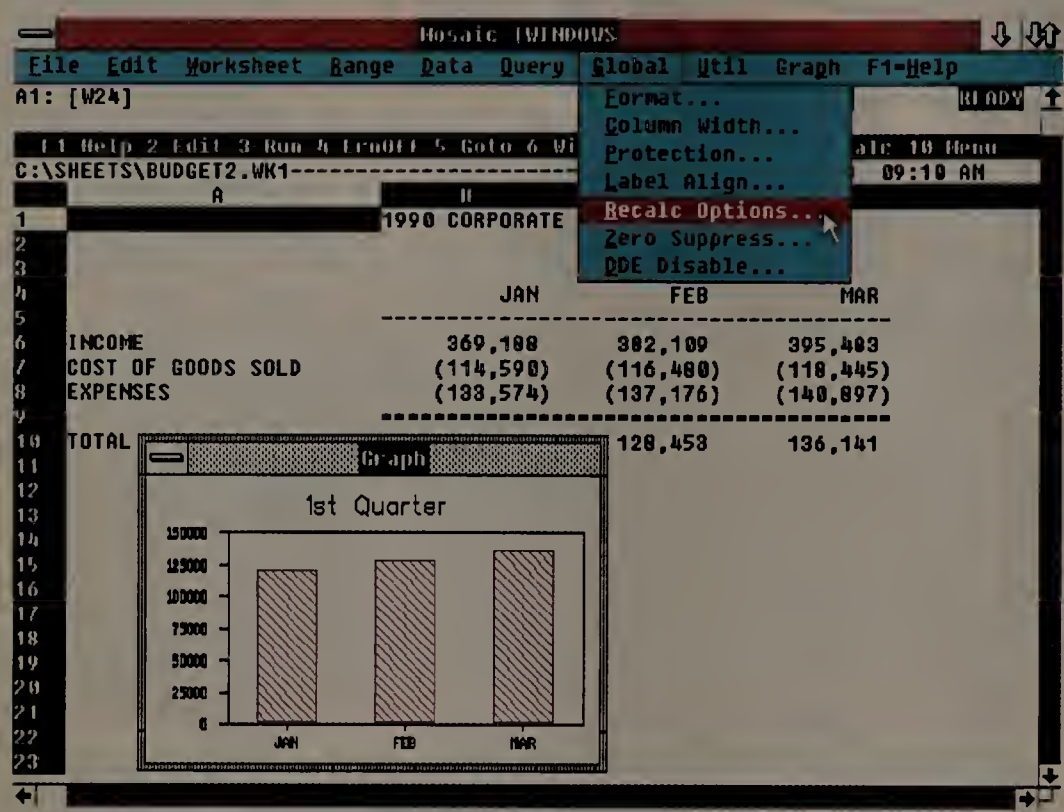
# TWINDOWS 1.0

**Spreadsheet**

**PROS:** Custom @ functions, dual-axis graphs, DDE support

**CONS:** Slow, buggy, poor memory use, minimal 1-2-3 compatibility, works only with Windows 2.11

**Review**




Twindows claims to be 1-2-3 compatible, but its menus differ quite a bit, and it can't run 1-2-3 macros. And unlike Excel, it can display only one graph at a time.

**Evelyn Morrison**

In the world of *Windows* spreadsheets, *Excel* used to be the only game in town. Now Mosaic Marketing is trying to up the ante with *Twindows*, a spreadsheet aimed at *1-2-3* vets who are eyeing the *Windows* interface.

But *Twindows* doesn't even come close to matching *Excel*'s power and flexibility, much less qualify as a *1-2-3* clone. It runs like it's stuck in molasses, and it frequently crashes. This is one program that's not ready for prime time.

*Twindows* isn't all bad news. As in *1-2-3* release 2.2, a worksheet can reference cells in an external file. And as in *Excel* (but not *2.2*), you can define custom @ functions, display cells in different colors based on their values, mix line and bar charts, and plot graphs with dual *y*-axes. You can also funnel in data via DDE using @ functions.

But these niceties aren't enough, especially when *Excel* is only $150 more. Unlike *Excel*, *Twindows* can display only one graph at a time, and you must manually update the worksheet link when numbers change. Print options are limited to a single typeface and size, with no shading or lines. And the "preview" option is misnamed, since it merely shrinks the displayed text.

Memory management is a pain. To use anything but conventional RAM, you must have an EMS board installed. The program can't use extended memory converted by *Windows* or any other emulator, which leaves many *Windows/386* users out in the cold. Worse, if you want *Twindows* to access EMS, you must load *Windows* with the /N switch. This kicks *Windows*' code out of expanded RAM into conventional RAM, where it eats up memory that could be used by other applications.

*Twindows* isn't much of a *1-2-3* clone either. It can read and write WK1 and WKS files but lacks *1-2-3* keystroke and macro compatibility. *Twindows* includes most *1-2-3* commands but puts them in different menus and uses different keys to invoke them. Pointing techniques used when building formulas in *1-2-3*—such as <Home> and <End>—don't even work.

Worse, *Twindows* macros must be created in learn mode, because *Twindows* records keystrokes and mouse movements as uneditable "messages." Since *Twindows* stores absolute screen positions rather than commands, a macro can bomb if it's run in a window whose dimensions have changed. Of course, since *Twindows* sometimes dumps you to DOS or the MS-DOS Executive for no good reason, this point may be moot.

A *1-2-3*–compatible *Windows* spreadsheet is a great idea, but *Twindows* doesn't cut it. Mosaic claims that a version to be released in mid-1990 will translate *1-2-3* macros, improve output, and offer 3-D file linking. But until *Twindows*' serious flaws are repaired, *Excel* is still the only game worth playing. ●

*Evelyn Morrison is a marketing manager for a retail clothing chain headquartered in the San Francisco Bay Area.*

## Where to Buy

**Twindows 1.0**
Mosaic Marketing Inc.
1972 Massachusetts Ave.
Cambridge, MA 02140
800/255-8662, 617/491-2434
LIST PRICE: $349
REQUIREMENTS: 640K, DOS 3.0 or later version, hard disk, graphics card, Windows 2.11
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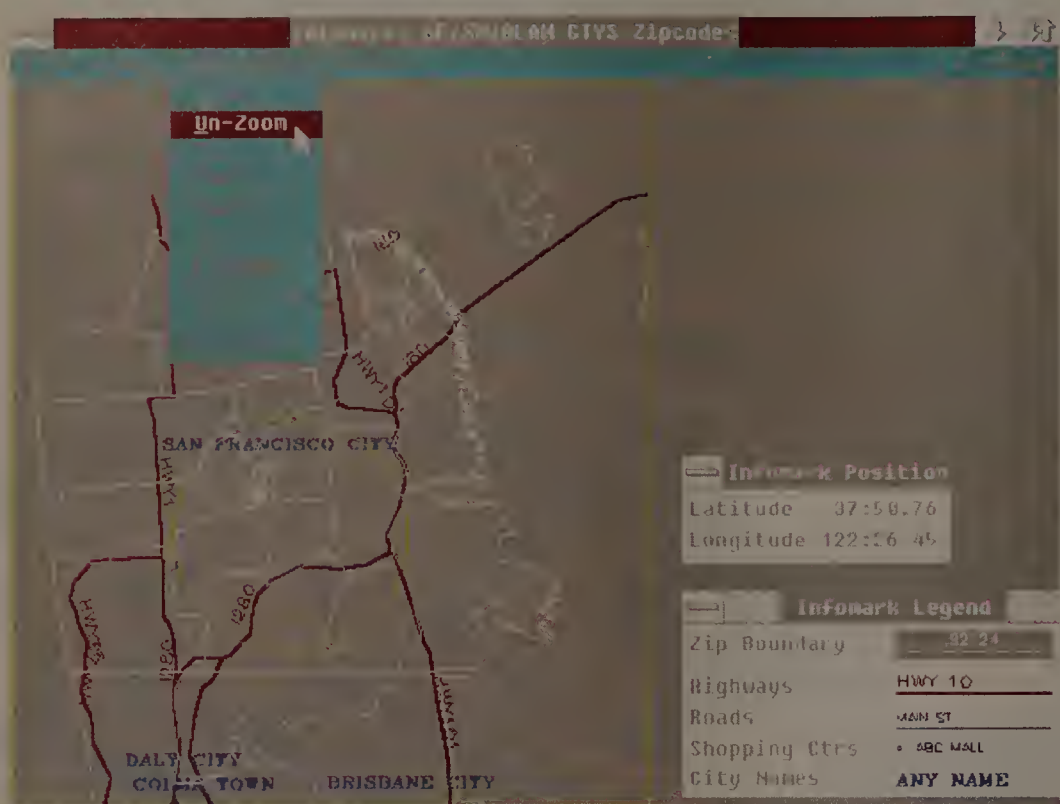
# INFOMARK EXPRESS 1.1

**Demographic program**

**PROS:** Easy to learn and use, lets you buy only data you need, has multiple reports

**CONS:** Can't customize reports, slow screen refresh, can't save views, no WKS or DBF output, won't run under Windows/386

**Review**




With Infomark Express, you can zoom in on a specific region and generate a variety of demographic reports. The selection can be based on a radius around a point (shown here) or by ZIP code, census tract, or an irregularly defined region.

**John Walkenbach**

In Marketing 101, the first rule you learn is to match your product or service to the right market. After all, a child-care center in a retirement community won't yield much of a profit. But to make the right match, you need the right demographic data.

Unfortunately, most businesses don't have the time or expertise to sift through the mountains of market data that might make the difference between profit and loss. Thanks to Equifax's *Infomark Express*, you won't have to. The company packages a slew of U.S. census and proprietary market data for particular metropolitan areas with an interactive program that lets even managers quickly generate useful demographic reports. If you need to profile a population right down to the neighborhood level, *Infomark* is the tool.

To run *Infomark*, you point at an area on an on-screen map, zoom in to the desired area, select a report, and print. The map can show regions by census tract, ZIP code, or county boundary, along with major roads, highways, cities, and shopping centers. You can also select a population within a given radius—say within 3 miles of a potential store location—or mark out an irregularly shaped region.

Reporting is *Infomark*'s forte. There are six standard demographic reports (on median income, age, and so on), which range from a trend report that shows 1980 census data, current-year estimates, and five-year projections to a report that shows potential consumer spending in ten categories, including retail sales and restaurants.

The Vision report is particularly intriguing, since it profiles the number of households that fall into various life-styles. These categories, such as "Pools and Patios" or "Sun City," are a handy way to pinpoint consumer income and spending patterns.

*Infomark* prints out reports in the background pretty quickly. But if numerous census tracts are displayed, screen redraw can slow output. You can't print thematic maps that display regions in different colors based on, say, median age. Note: *Infomark* isn't *Windows 3.0*–"aware," so it won't be able to tap new memory and color features, although a future version will.

But these are quibbles. *Infomark* is so straightforward that novices can become experts in a few hours. For small- to medium-sized businesses, *Infomark* is a breakthrough in demographic data retrieval and analysis. If you need to find the right market—and if you're competing with well-heeled corporations—*Infomark Express* could make the difference. ●

*John Walkenbach is market research manager for a leading savings and loan based in Southern California.*

## Where to Buy

**Infomark Express 1.1**
Equifax Marketing Decision Systems
539 Encinitas Blvd.
Encinitas, CA 92024-9007
800/877-5560
LIST PRICE: $2995 (includes Windows/286 2.11, mouse, and data for one metropolitan area); additional areas $2995 (quantity discount pricing available); free demo disk
REQUIREMENTS: 640K, DOS 3.0 or later version, Windows/286 2.11, 1.2MB or 1.44MB floppy disk drive, hard disk with 4MB of free space, EGA or higher graphics resolution, mouse
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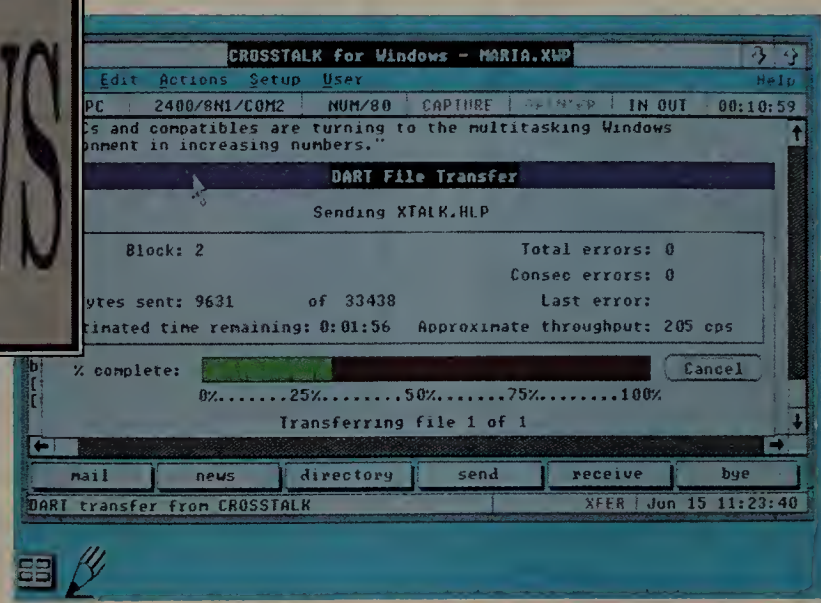


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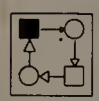

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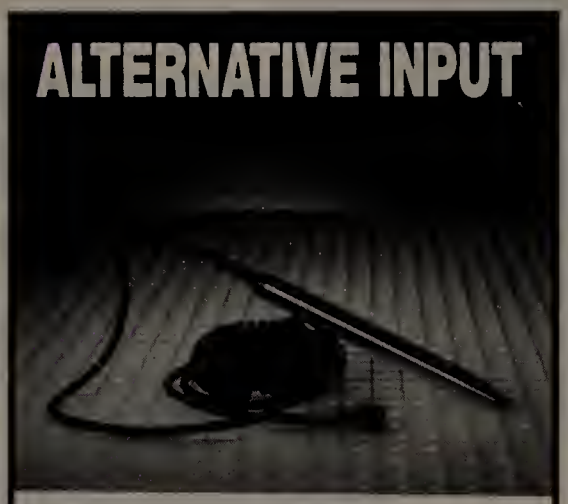

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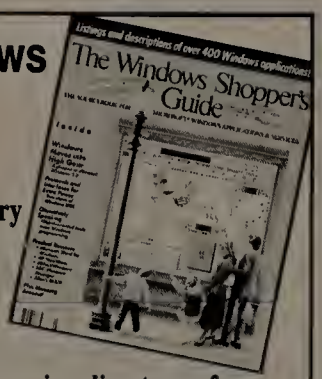


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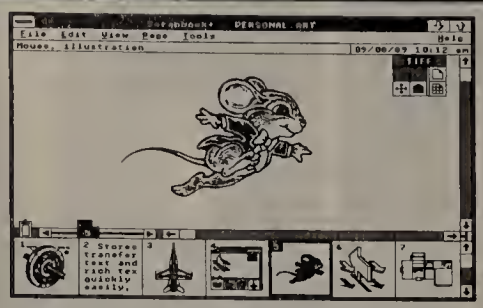

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**Circle 113 on reader service card**

# LOOK SHARP WITH A SUPER-VGA BOARD

ERIC KNORR
AND
MATT LAKE

If you're buying a new system or thinking about a graphics upgrade, there's no reason to consider anything less than a board compatible with IBM's Video Graphics Array (VGA) standard. While VGA resolution is only 37 percent sharper than Enhanced Graphics Adapter (EGA) images, VGA screens *look* much better—especially when displaying text. You also get a 256-color mode (with a 262,144-color palette), a vast improvement over the EGA's 16-color maximum.

IBM'S THREE-YEAR-OLD VGA STANDARD IS TODAY'S BASELINE FOR PC GRAPHICS. OUR LISTING FOCUSES ON BOARDS THAT GO WELL BEYOND VGA TO DELIVER THE SHARPER IMAGES THAT GRAPHICAL APPLICATIONS DEMAND.

VGA boards are now commodity items, and manufacturers must use price, performance, and extra features to differentiate their products. The most basic (and usually the cheapest) models do no more than IBM's original VGA: 16 colors at 640 by 480 resolution, 256 colors at 320 by 200, and emulation of the EGA, Color/Graphics Adapter (CGA), and Monochrome Display Adapter (MDA). Some higher-priced boards speed up performance for certain applications.

Many VGA boards also improve on the standard by offering higher-resolution modes and more colors; however, none of these so-called super-VGA modes has broad application support. Unless the board manufacturer provides a software driver for your application, you probably won't be able to use the board's super-VGA mode.

This guide lists VGA boards to suit every taste, from inexpensive clones to boards with a slew of extra features. The emphasis is on super-VGA modes—but bear in mind that they cost more and require both a multiscan monitor and software support. Today, plain-VGA components should cost no more than EGA, but extra capabilities quickly raise the price.

**FOR SOFTWARE, A COMPATIBLE AFFAIR**

It's unlikely that any board listed here will have compatibility problems with software written for IBM's VGA—and that includes almost all mainstream business applications released in the last year and a half. People don't always upgrade their software, though, which is one reason for VGA's backward compatibility with older graphics standards.

Today's VGA boards have their act together, but dealers don't always sell the latest revision. Some early boards were unreliable emulators, while others generated too much electromagnetic radiation for home use, interfering with radio and TV signals. The best way to ensure you're getting the latest and greatest board is to check the number listed in the table indicating manufacturer name and revision against the VGA chip's number on the board you want to buy. If they don't match, chances are that the board in your hands is an earlier version—and less capable than the current one.

**WHEN BOARD AND PC CONFLICT**

Certain VGA boards simply won't work in certain PCs. The problem usually stems from a performance enhancement trick

BUD PEEN

## VGA BOARDS

| 8-Bit Boards<br>MANUFACTURER | Product | Base price/ with maximum RAM | Warranty (years) | Minimum/ maximum RAM | Chip maker and revision | BIOS relocation/ can be disabled | Digital monitor port |
|---|---|---|---|---|---|---|---|
| AST RESEARCH | AST VGA | $399 | 2 | 256K | WDI PVGA1A | Y/Y | N |
| GENOA SYSTEMS | Genoa SuperVGA 6100 | $249 | 1 | 256K | Genoa GVGA | Y/N | N |
| HEADLAND TECHNOLOGY | Video Seven Vega VGA | $247 | 7 | 256K | Video Seven/Cirrus Logic | Y/Y | Y |
| HERCULES COMPUTER TECHNOLOGY | Hercules VGA Card | $299 | 2 | 256K | Intel 82706 | Y/Y | N |
| MAXLOGIC | MaxVGA | $249 | 2 | 256K | Cirrus Logic 510A/520A | Y/Y | Y |
| PRISM IMAGING SYSTEMS | Prism Elan VGA | $299/$379 | lifetime | 256K/512K | Zymos Poach51 | Y/Y | N |
| RENAISSANCE GRX | RVGA I | $249 | 2 | 256K | Eagle II | Y/Y | N |
| SIGMA DESIGNS | VGA/H | $369 | 1 | 256K | Tseng ET3000AF | Y/Y | Y |
| STB SYSTEMS | AutoVGA | $219 | 2 | 256K | Cirrus Logic 510/520 | Y/Y | N |
| TECMAR | VGA | $330 | 2 | 256K | Tseng ET3000BX | Y/Y | Y |
| TRIDENT MICROSYSTEMS | 8808 8-Bit VGA Board | $159/$183 | 2 | 256K/512K | Trident 8800CS | Y/Y | Y |
| WESTERN DIGITAL | Paradise Basic VGA | $199 | 3 | 256K | WDI PVGA1A | Y/N | N |
| WYSE TECHNOLOGY | WY-450 VGA Adapter | $345 | 1 | 256K | Tseng 3000AX | Y/Y | N |

| 16-Bit Boards<br>MANUFACTURER | Product | Base price/ with maximum RAM | Warranty (years) | Minimum/ maximum RAM | Chip maker and revision | BIOS relocation/ can be disabled | Digital monitor port |
|---|---|---|---|---|---|---|---|
| AST RESEARCH | AST VGA Plus[1] | $449/$574 | 2 | 256K/512K | WDI PVGA1A | Y/Y | N |
| ATD | ATD Enhanced VGA | $199/$250 | 1 | 256K/512K | Trident 8900 | Y/N | Y |
| ATD | ATD VGA | $199 | 1 | 256K | Trident 8800 | Y/N | Y |
| ATI TECHNOLOGIES | VGA Wonder | $359/$469[2] | 2 | 256K/512K | ATI 18800-1 | Y/Y | Y |
| ATI TECHNOLOGIES | VGA Wonder VRAM | $499/$599[2] | 2 | 256K/512K | ATI 28800 | Y/Y | N |
| BOCA RESEARCH | 1024VGA by BOCA[1] | $395 | 2 | 512K | Chips and Technologies 82C451 rev. 3 | N/N | N |
| BOCA RESEARCH | SuperVGA by BOCA | $245 | 2 | 256K | Chips and Technologies 82C451B | N/N | N |
| BOCA RESEARCH | VGA by BOCA | $195 | 2 | 256K | Chips and Technologies 82C451B | N/N | N |
| EVEREX SYSTEMS | Viewpoint VGA | $299/$369 | 1 | 256K/512K | Trident 8800CS | Y/Y | Y |
| GENOA SYSTEMS | Genoa SuperVGA 6300 | $299/$349 | 1 | 256K/512K | Genoa GVGA | Y/N | N |
| GENOA SYSTEMS | Genoa SuperVGA 6400 | $399 | 1 | 512K | Genoa GVGA | Y/N | N |
| HEADLAND TECHNOLOGY | Video Seven V-RAM VGA | $697/$747 | 7 | 256K/512K | HT208 | Y/Y | N |
| HEADLAND TECHNOLOGY | Video Seven VGA 1024i | $397/$497 | 7 | 256K/512K | HT208 | Y/Y | N |
| MAXLOGIC | MaxVGA/16 | $299 | 2 | 256K | Cirrus Logic 510A/520A | Y/Y | Y |
| MICRO-LABS | Ultimate VGA | $375/$475 | 3 | 512K/1024K | Tseng ET4000C | Y/Y | Y |
| MICRO-LABS | VGA Solution | $295/$350 | 3 | 256K/512K | Tseng ET3000AX | Y/Y | Y |
| NATIONAL SEMICONDUCTOR | QuadVGA Spectra | $399/$499 | 1 | 256K/512K | Tseng ET3000AX | N/N | Y |
| ORCHID TECHNOLOGY | Peanut VGA | $199 | 1 | 256K | Orchid | Y/Y | Y |
| ORCHID TECHNOLOGY | ProDesigner VGA | $395/$495 | 2[3] | 256K/512K | Tseng ET3000 | Y/N | N |
| PRISM IMAGING SYSTEMS | Prism Eclipse VGA | $599 | lifetime | 512K | Zymos Poach51 | Y/Y | Y |
| PRISM IMAGING SYSTEMS | Prism Elite VGA | $349/$499 | lifetime | 256K/512K | Zymos Poach51 | Y/Y | N |
| RENAISSANCE GRX | RVGA II | $349 | 2 | 256K | Eagle II | Y/Y | Y |
| SIGMA DESIGNS | VGA/HP16 | $399/$499 | 1 | 256K/512K | Chips and Technologies 80C452 | Y/Y | N |
| STB SYSTEMS | VGA EM-16 | $369/$469 | 2 | 256K/512K | Tseng ET3000AX | Y/Y | Y |
| STB SYSTEMS | VGA 800/16 | $249 | 2 | 256K | Chips and Technologies 451B | Y/Y | N |
| TECMAR | VGA AD/GM | $580 | 2 | 512K | Tseng ET3000AX | Y/Y | Y |
| TRIDENT MICROSYSTEMS | 8816 16-Bit VGA Board | $199/$249 | 2 | 256K/512K | Trident 8800CS | Y/Y | Y |
| TRIDENT MICROSYSTEMS | 8916 2/8 16-Bit VGA Board | $505/$595 | 2 | 256K/1MB | Trident 8900 | Y/Y | Y |
| VERMONT MICROSYSTEMS | Vermont VGA | $500 | 1 | 256K | Video Seven V7VGA | N/N | N |
| WESTERN DIGITAL | Paradise VGA 1024 | $369/$469 | 3 | 256K/512K | WDI PVGA2 | Y/N | N |
| WESTERN DIGITAL | Paradise VGA Plus 16 | $329 | 3 | 256K | WDI PVGA1 | Y/N | N |
| WYSE TECHNOLOGY | WY-460 Enhanced VGA Adapter | $470 | 1 | 512K | Tseng 3000AX | Y/Y | N |

1 Works in 16-bit slot only. 2 Price includes mouse port and Microsoft Mouse. 3 Extended to four years with return of warranty card. 4 In 8-bit mode only.

| Runs in 12.5-MHz bus | Custom fonts/ font editor | COLORS AVAILABLE IN SUPER-VGA MODES 800×600 Windows | PM | AutoCAD | Ventura | GEM | 1024×768 Windows | PM | AutoCAD | Ventura | GEM | 132-COLUMN MODE 1-2-3 | Symphony | Framework | Reader service number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y | N/N | 16 | 16 | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | Y | Y | Y | 685 |
| N | N/N | 8 | 0 | 16 | 16 | 16 | 4 | 0 | 4 | 2 | 2 | Y | Y | Y | 686 |
| N | N/N | 16 | 16 | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | Y | Y | N | 687 |
| N | N/N | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N | N | N | 688 |
| Y | N/N | 8 | 0 | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | N | N | N | 689 |
| Y | Y/N | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | Y | Y | Y | 690 |
| Y | N/N | 16 | 16 | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | N | N | N | 691 |
| N | N/N | 16 | 0 | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | Y | Y | Y | 692 |
| Y | N/N | 16 | 0 | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | Y | Y | N | 693 |
| Y | Y/N | 16 | 16 | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | Y | Y | Y | 694 |
| Y | N/N | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | Y | Y | Y | 695 |
| Y | N/N | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N | N | N | 696 |
| Y | Y/Y | 16 | 0 | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | Y | Y | N | 697 |

| Runs in 12.5-MHz bus | Custom fonts/ font editor | COLORS AVAILABLE IN SUPER-VGA MODES 800×600 Windows | PM | AutoCAD | Ventura | GEM | 1024×768 Windows | PM | AutoCAD | Ventura | GEM | 132-COLUMN MODE 1-2-3 | Symphony | Framework | Reader service number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y | N/N | 16 | 16 | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | Y | Y | Y | 685 |
| Y | N/N | 256 | 0 | 256 | 0 | 0 | 16 | 0 | 16 | 0 | 0 | Y | Y | Y | 698 |
| N | N/N | 16 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Y | Y | Y | 698 |
| Y | N/N | 256 | 256 | 256 | 256 | 256 | 16 | 0 | 16 | 16 | 16 | Y | Y | Y | 699 |
| Y | N/N | 256 | 256 | 256 | 256 | 256 | 16 | 0 | 16 | 16 | 16 | Y | Y | Y | 699 |
| Y | N/N | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | Y | Y | Y | 700 |
| Y | N/N | 16 | 16 | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | Y | Y | Y | 700 |
| Y | N/N | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N | N | N | 700 |
| Y | N/N | 16 | 16 | 256 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | Y | Y | Y | 701 |
| N | N/N | 8 | 0 | 16 | 16 | 16 | 4 | 0 | 4 | 2 | 2 | Y | Y | Y | 686 |
| N | N/N | 256 | 0 | 256 | 256 | 256 | 16 | 0 | 16 | 16 | 16 | Y | Y | Y | 686 |
| Y | N/N | 256 | 256 | 256 | 256 | 256 | 16 | 16 | 16 | 16 | 16 | Y | Y | N | 687 |
| Y | N/N | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | Y | Y | N | 687 |
| Y | N/N | 8 | 0 | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | N | N | N | 689 |
| Y | Y/Y | 8 | 0 | 16 | 8 | 8 | 8 | 0 | 16 | 8 | 8 | Y | Y | Y | 702 |
| Y | Y/Y | 8 | 0 | 16 | 8 | 8 | 8 | 0 | 16 | 8 | 8 | Y | Y | Y | 702 |
| Y | Y/Y | 256 | 256 | 256 | 256 | 256 | 16 | 0 | 16 | 16 | 16 | Y | Y | N | 703 |
| Y | N/N | 16 | 0 | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | Y | N | N | 704 |
| Y | Y/Y | 16 | 0 | 16 | 16 | 16 | 16 | 0 | 16 | 16 | 16 | Y | Y | N | 704 |
| Y | Y/N | 256 | 256 | 256 | 256 | 256 | 16 | 16 | 16 | 16 | 16 | Y | Y | Y | 690 |
| Y | Y/N | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | Y | Y | Y | 690 |
| Y | N/N | 16 | 16 | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | Y | Y | Y | 691 |
| Y | N/N | 16 | 0 | 16 | 16 | 16 | 16 | 0 | 16 | 16 | 16 | Y | Y | Y | 692 |
| Y | N/N | 16 | 0 | 16 | 16 | 16 | 16 | 0 | 16 | 16 | 16 | Y | Y | N | 693 |
| Y | N/N | 16 | 0 | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | Y | Y | Y | 693 |
| Y | Y/N | 16 | 256 | 256 | 256 | 256 | 16 | 16 | 16 | 16 | 16 | Y | Y | Y | 694 |
| Y | N/N | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | Y | Y | Y | 695 |
| Y | N/N | 256 | 256 | 256 | 256 | 256 | 256 | 256 | 256 | 256 | 256 | Y | Y | Y | 695 |
| N | N/N | 16 | 16 | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | Y | Y | Y | 705 |
| Y[4] | N/N | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | Y | Y | Y | 696 |
| Y[4] | N/N | 16 | 16 | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | Y | Y | Y | 696 |
| Y | Y/Y | 256 | 0 | 256 | 256 | 256 | 16 | 16 | 16 | 16 | 16 | Y | Y | N | 697 |

**For more information about all products in this table, circle reader service no. 907.**

known as BIOS relocation. (For a discussion of BIOS relocation, see the sidebar to "Five at 25 MHz: The System Standard Rises Higher," April 1990.)

If the system and the VGA board both try to copy their BIOS's into the same location in memory, the PC won't boot. Thus, the ability to disable the VGA's BIOS relocation feature is essential. Some cards also let you change the video BIOS relocation address so that both relocation schemes can coexist.

The speed of a system's I/O bus can also cause problems. A handful of fast PCs let you switch the I/O bus from the standard 8 MHz to 12.5 MHz. However, not all the boards listed here run at that speed; the ones that don't may prevent the system from booting or cause it to crash. If this happens, you'll have to turn the I/O clock back to standard speed.

**SPEED AND OTHER RED HERRINGS**

Manufacturers may boast about their board's fast performance, but in fact it's difficult to detect differences in speed when running most applications in standard 640 by 480 VGA mode. In *PC World*'s May 1989 tests ("VGA Boards Raise the Standard"), we discovered the greatest speed differences when scrolling text in *Microsoft Word*.

In the super-VGA modes, however, things get more interesting. When a board is shuffling pixels around the screen at 1024 by 768 resolution (the highest super-VGA resolution) instead of 640 by 480, screen refresh can take much longer. In that mode, the most significant performance factor is the quality of the vendor's software driver.

Often, but not always, 16-bit boards are faster (and more expensive) than 8-bit boards. More important is whether or not the board uses video RAM (VRAM). VRAMs are memory chips with special architecture that's well suited for video cards, and they cost twice as much as regular RAM. Any manufacturer that includes VRAM on board is serious about speed and all-around quality. In this guide, only ATI's VGA Wonder VRAM, Headland's Video Seven V-RAM VGA, and Vermont Microsystems' VGA use VRAM.

**NAVIGATING THE SUPER-VGA MAZE**

The applications you want to run should be the key factor in your VGA purchase decision. For word processing, spreadsheets, data bases, and other text-based applications, basic VGA capability is all you need. But if you regularly use *Windows*, CAD, or other graphics-intensive software, a super-VGA board offers a tempting balance of high resolution and reasonable price.

This guide lists super-VGA drivers for the most widely supported applications and at the two most popular super-VGA resolutions, 800 by 600 and 1024 by 768. Super-VGA drivers come on a disk with the board; each driver requires a separate installation procedure.

*Windows* and Presentation Manager users who stick to their respective enviroments will profit with least effort from super-VGA. Instead of installing a different driver for each application, they can install just one environmental driver; then any program that runs under the environment will have access to the enhanced resolution.

If you plan on running software at 1024 by 768, make sure you get a multiscan or high-resolution monitor that can handle it (see "Smart Monitors, Smart Buys" in this issue). Also, remember that at this resolution, performance counts. The only way to tell whether screen updates will be bearable or excruciatingly slow is by testing the board with the program you want to use.

Speed isn't the only thing affected by driver quality. A poor driver may produce a misaligned image, brightness changes, garbage characters, and flicker at the top or bottom of the screen. With some applications, users also complain that text looks squashed at super-VGA resolutions. To correct this, some board manufacturers supply special screen fonts that demand yet another installation procedure.

An industry consortium called the Video Electronic Standards Association (VESA) is attempting to rationalize super-VGA resolutions by creating two new standards. The organization has published two specs: VESA 1 (800 by 600 at 16 colors) and VESA 2 (1024 by 768 with an unspecified number of colors).

The idea is to get software developers to write to the VESA specs. VESA 1 and VESA 2 would appear on software installation menus the same way VGA, EGA, and the like do. Software support from vendors would not only eliminate sometimes complicated driver installation but would also result in faster, bet-

ter-written drivers. Unfortunately, little support has yet appeared.

**HARDWARE ON THE HORIZON**

It's no coincidence that super-VGA boards top out at 1024 by 768. That resolution was established by IBM's high-end 8514/A graphics adapter, released at the same time as the VGA. Many in the industry believe that 8514/A represents the next mainstream graphics standard.

A competing group of board makers is attempting to establish a different 1024 by 768 standard built around the TI 34010 graphics coprocessor and its Texas Instruments Graphics Adapter (TIGA) programming interface. Running at 1024 by 768, both 34010 and 8514/A boards deliver much better performance than super-VGA boards; in fact, most are considerably faster at that resolution than VGAs in standard 640 by 480 mode.

However, there's no guarantee that the 34010 and 8514/A boards will run VGA software: Many require a VGA board in an adjacent slot connected by a pass-through cable that plugs into the VGA's monitor port. When you need to run a program outside the small circle of supported applications, you must switch back to the workaday VGA.

It makes no sense to buy 8514/A or 34010 boards costing several times as much as basic VGA in the hope that software support will come later. Software considerations must come first. If your application requires a sharper image than standard VGA boards can provide, one of the super-VGA boards with an appropriate driver may be all you need. ●

*Eric Knorr is a senior editor for* PC World, *and Matt Lake is an assistant editor for* Publish.

**WHERE TO BUY**

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408/954-8525,
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416/756-0720 (fax)

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407/997-6227,
407/997-0918 (fax)

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415/498-1111,
415/651-0728 (fax)

**Genoa Systems**
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408/432-9090,
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415/540-6621 (fax)

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415/683-0300,
415/490-9312 (fax)

**Prism Imaging Systems**
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415/490-9360,
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**Renaissance GRX Performance Graphics**
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206/454-8086,
206/462-5640 (fax)

**Sigma Designs**
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**STB Systems**
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216/349-0600,
216/349-0851 (fax)

**Trident Microsystems**
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Sunnyvale, CA 94086
408/738-3194,
408/738-0905 (fax)

**Vermont Microsystems**
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**Western Digital**
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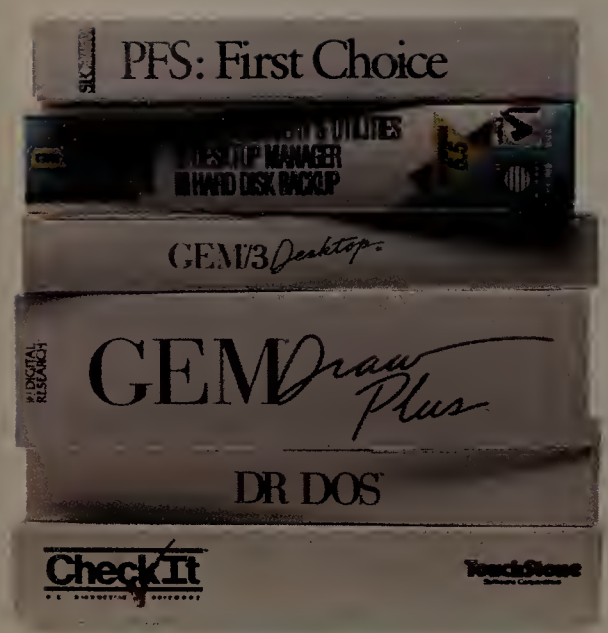
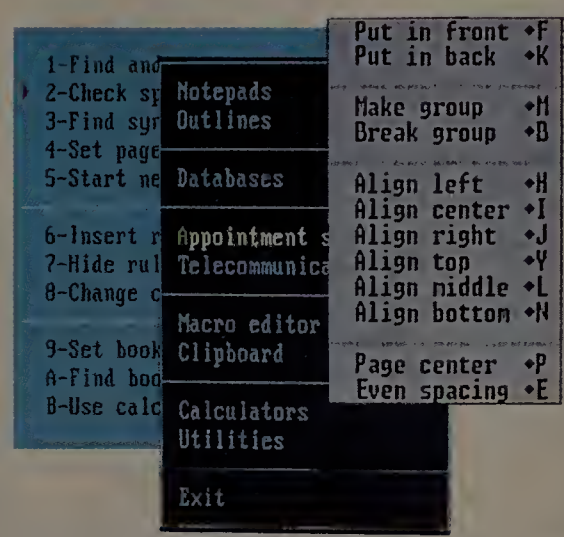



*Loads of software, pre-loaded on hard-disk*

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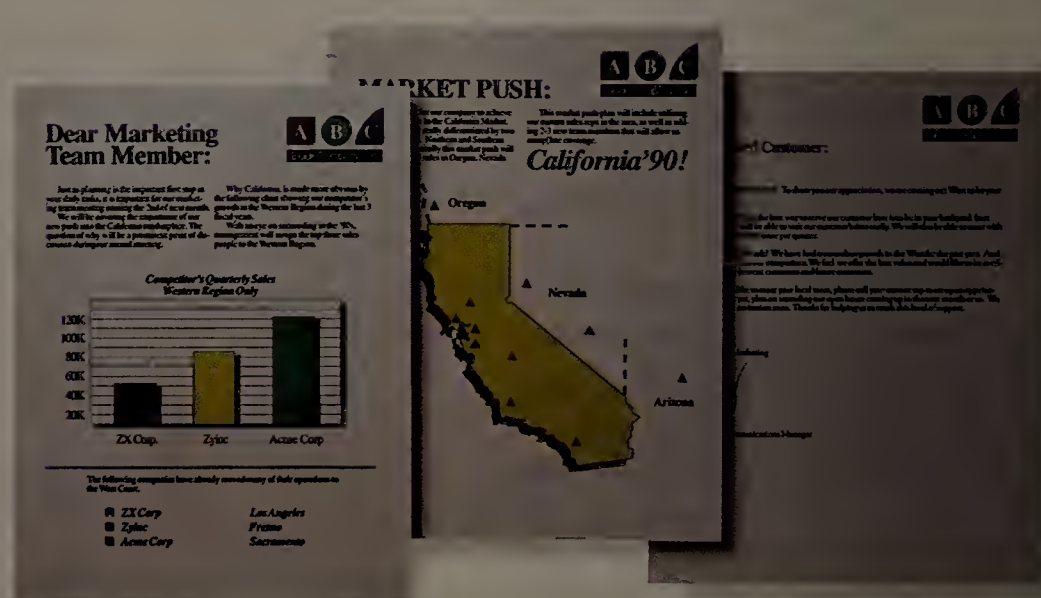


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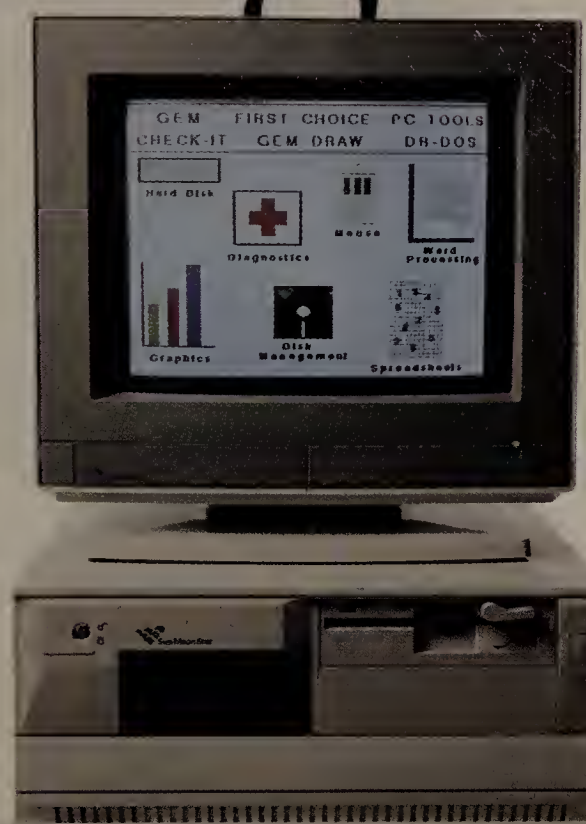


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# The Do-It-Yourself BBS

**Setting up an in-house BBS doesn't have to cost a fortune. Maxihost—a powerful shareware package—makes it easy to keep your business well connected.**

Communications

*Judy Getts*

## INSIDE HOW TO


186 **User Group Tips**
- Make *1-2-3* use extended ASCII
- Simpler *PC-File* clones

189 **Spreadsheets**
**Spreadsheets (A..Z)**
A step-by-step worksheet make-over with *Allways*.

195 **Word Processing**
**Words Into Print**
Create multiple-column pages with *WordPerfect*.

201 **Data Management**
**Data Basics**
A beginner's guide to building relational links.

207 **Desktop Publishing**
**The Art of Persuasion**
The strategic use of white space: design guidelines from an expert.


Electronic bulletin boards are a great way for companies to link up far-flung employees or provide low-cost customer support, but setting one up is usually a hassle. This isn't the case with *Maxihost*, a versatile shareware BBS that almost anyone can use.

Originally known as *Minihost*, a simple remote-access communications package, *Maxihost* is now a single-line BBS that supports 15 transfer protocols and a virtually unlimited number of callers. While it lacks the sophisticated teleconferencing, program libraries, and expandability of programs like *RBBS-PC* or *The Major BBS*, *Maxihost*'s ample security features and easy setup make it ideal for small companies looking for a way to exchange messages and swap files. Setting up a *Maxihost* BBS is as simple as editing the program's configuration file, MAXIHOST.CNF. All you need is a copy of the program, a word processor, a Hayes-compatible modem, and a hard disk. This article explains how to create message conferences, add users, and establish security procedures—basic principles that apply to the setup of virtually any BBS.

### Laying the Groundwork

First, you'll need to set up your modem: Make sure that auto-answer is disabled and that the data-terminal-ready and carrier-detect modes aren't forced on. Depending on the modem, you must either flip DIP switches or edit the INITSTRING= line in the configuration file. For example, you'd use **initstring=at&d2v1q0e0s0=0&c1&j0&t5l3b1m1&w** with a

Hayes Smartmodem 2400.

Next, create directories for *Maxihost* files, and modify your CONFIG.SYS and AUTOEXEC.BAT files:

1. At the C> prompt, type **md c:\maxihost <Enter>**.
2. Copy the program's files into the new directory.
3. Type **md c:\maxihost\public** to create a subdirectory called PUBLIC for callers to access when they log on.
4. Make a subdirectory for uploading files; call it **c:\maxihost\upload.**
5. To display color BBS screens, you need an ANSI driver installed. Make sure ANSI.SYS is in the \DOS directory. Then load CONFIG.SYS into your word processor, and add a line reading **device=c:\dos\ansi.sys.**
6. Load AUTOEXEC.BAT into your word processor, and add **;c:\maxihost** to your PATH command. If you're dedicating a PC to full-time BBS duty, you may want *Maxihost* to load at start-up. If so, add

**cd c:\maxihost**
**maxihost**

to the end of AUTOEXEC.BAT.

### Configuring Maxihost

*Maxihost*'s settings are contained in a text file called MAXIHOST.CNF. Changing settings is straightforward. For example, to increase the BBS's top modem speed from 2400 bps to 9600 bps, simply load the file into a word processor and change 'BAUD=2400' to **BAUD=9600.** *Maxihost* provides a default value for each setting, but you can easily change each setting's default value to suit your needs.

The following sections explain how to set up an on-line conference, add users, and assign security levels. But first you must tell *Maxihost* where to find your PUBLIC and UPLOAD subdirectories.

1. Start your word processor, and load MAXIHOST.CNF.
2. Find the line that begins with 'START=', and add the directory's path, so that the string reads **start=c:\maxihost\public.**
3. Locate 'UPLOAD=', and type **c:\maxihost\upload** immediately following the equal sign.

## How MATCHLEVEL Works

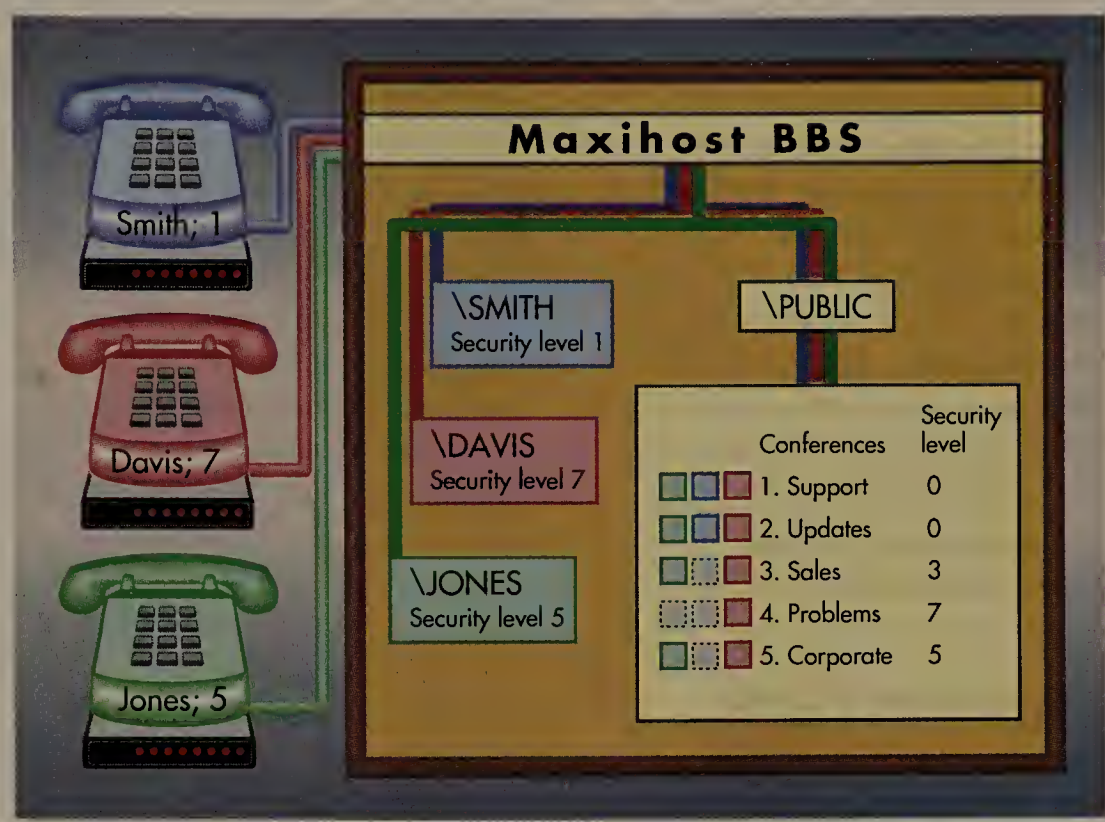


**FIGURE 1: Maxihost lets you set up private subdirectories for selected users. When you set MATCHLEVEL= y, each user can access only that subdirectory whose security level matches his or her own. However, access to public message conferences is unrestricted by MATCHLEVEL. For example, while Jones is unable to get into Smith's directory, he can still access any conference with a security level of 5 or less.**

### ▶ Create Message Conferences

Public message conferences let BBS users exchange information on specific topics. *Maxihost* lets you create up to ten E-mail conferences; simply add a CONFERENCE= line to the configuration file for each. The line must include a unique ID number, the conference name, and the security level required to access the conference. You can add an optional 25-character description. For example, to create a forum where customers can get answers to technical support questions, type **conference=1;Support;0;Tech Support Hotline.**

## ▶ Add Users

You can set up *Maxihost* to accept a virtually unlimited number of callers or restrict the system to a specific set of users. To limit BBS access to named users, set the CLOSEDSYSTEM= line to **y**. To add users to a closed system, simply append their names to the user directory at the end of the file. The entry should contain a name and a password, indicate whether the user wants color screens, and include his or her security level and an optional phone number that the BBS can call back—for example, **user=Tom Jones;** *password*;**y;5;555-1234.**

## ▶ Assign Security Levels

Assigning security levels for users, directories, and conferences is vital to BBS setup. *Maxihost* lets you define 32,767 levels, but you'll probably need only a few. First, make a list of everyone who will be calling the BBS and what each person will need access to. Give callers access to only the directories and files they need to use. Next, keep callers from snooping around your hard disk. The DEFAULTS= setting controls access to non-BBS drives and directories. If you assign DEFAULTS= the highest security level (the default is 9), only you will have full access to your files.

Assign lower security levels for BBS directories, drives, and files by adding PROTECT= entries. For example, type **protect=c:\maxihost\upload;3** to limit access to the UPLOAD subdirectory to users with a security level of 3 or higher.

## ▶ Private Access

Assigning private subdirectories to selected users lets you control access to sensitive information; users can jump to their directories to download (but not upload) important files.

To ensure privacy, you'll need to give users a unique security level, plus the ability to change directories. You'll also need to set the MATCHLEVEL= line to **y**, which lets users access only directories whose security levels match their own. (The MATCHLEVEL command applies only to directories; conferences and menu commands are unaffected. See **FIGURE 1.**)

Here's how to set up a private directory for Mr. Jones.

1. Create a subdirectory with **md c:\maxihost\jones.**
2. Open MAXIHOST.CNF, and set MATCHLEVEL= to **y**.
3. Assign the user's unique security level to the subdirectory by adding another PROTECT= line. Type **protect=c:\maxihost\jones;5.** (The number 5 is Mr. Jones's unique security level.)
4. To enable Jones to jump to his directory, locate the MENU= CHANGEDIR;*nn* line, and assign a security level of 5 or less.

With MENU=, you can assign security levels to all *Maxihost* menu functions.

### Security Specifics

*Maxihost* provides a slew of useful security features. Want your BBS to hang up after users log on and then call them back? Set CALLBACK= to **y**. To keep a detailed log of caller activity, set LOGFILE= to **y**. And if you want the system to track failed log-on attempts and lock out names that have been submitted unsuccessfully, set USERLOCK= to **y**.

You can even thwart "demon dialers" who ferret out computer phone numbers by dialing every number in an exchange. Setting RINGBACK= to **y** means users must call the system, hang up, and call back again to connect to the BBS.

### Create Custom Screens

Though *Maxihost* comes with introductory and bulletin screens, creating your own screens helps personalize the BBS. You'll need an ANSI screen painter like *TheDraw*, a popular shareware package that lets you add color, graphics, fonts, fill patterns, and animation to your screens.

Once you've created the introductory screen, be sure to save it in both graphics (ANSI) and text (ASCII) formats, to accommodate non-ANSI terminals. Save the ANSI version as **welcome.g00** and the ASCII version as **welcome.t00**, then copy both into the MAXIHOST directory.

Bulletins are a good way to broadcast general information about the BBS. To run multiple bulletins, you'll need to create a menu screen that lists each bulletin name next to the number the caller must press in order to read it. Save an ANSI version of the menu as **bulletin.g00** and an ASCII version as **bulletin.t00**, then create ANSI and ASCII versions of each bulletin. If a caller must press **1** to read a bulletin, use file extensions **G01** and **T01**; if the caller presses **2**, use **G02** and **T02**, and so on. Copy all bulletin files into the MAXIHOST directory.

### Remote Control

*Maxihost* is also a remote-access package. Using TRAPDOOR.BAT, users can call in to the BBS and run up to nine applica-

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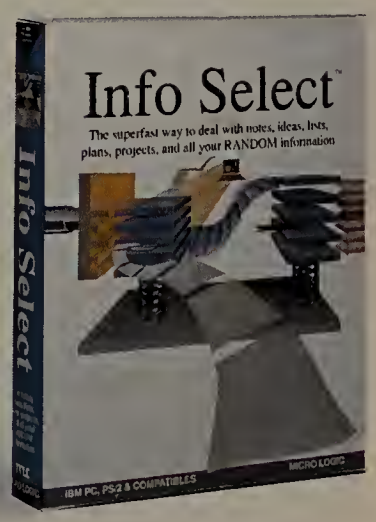


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**BASIC OPERATION:** You will see several windows of different sizes side-by-side on your screen. Info Select windows can hold: notes, plans, lists, facts, letters, contacts, and much more. You can: open a new window, type into it, and shape it; edit an existing window; resize, remove, or print a window; browse through windows with the arrow keys; search for a group of windows related by a word or phrase; hot-key between INFO SELECT and a wordprocessor or spreadsheet; and much more. **EASY POWERFUL FEATURES:** five ways to see overviews; hypertext; fast sort; line drawing; date tickler; dialer; searching by text or date ranges; add columns of numbers; 3-D wordprocessing; support of some commands of popular wordprocessors; can store data in EMS; template or free-form windows; import and export files, screens, and databases; move, join, and duplicate windows; efficient on portables; stand-alone or memory-resident; pull-across menus; and much more. Data is structured in multiple stacks of intelligent text windows; uses a unique easy powerful system of parallel text processing and progressive resolution searching without keywords. Version available with LAN file locking and sharing. **SPECIFICATIONS:** infobases up to 10 megabytes; text searches up to 700kb/sec; up to 32,000 characters per window; up to 64,000 windows per infobase; takes just 7K in swap mode; for the IBM PC/XT/AT/PS2 and true compatibles; not copy protected. **MAIL ORDERS:** Send name, address, phone number, and payment by check, Visa, or MC to address shown. Please include $3.50 shipping ($10 outside continental USA). 30 day money back guarantee. **TORNADO OWNERS:** INFO SELECT includes everything in Tornado and much more. Call today for our special limited time trade-up offer. **EUROPEAN CUSTOMERS:** Contact Atlantex U.S.A. (203) 655-6980. **TRADEMARKS:** Trademark (owner): Tornado and Info Select (Micro Logic), Agenda (Lotus Development), Sidekick (Borland International), Grandview (Symantec), IBM PC, XT, AT, PS/2 (IBM). © 1990 Micro Logic Corp. U.S.A.

tions. However, TRAPDOOR won't work with programs that write directly to the keyboard or to screen memory, such as *Microsoft Word*. To use such programs, you'll need a copy of a shareware package called *Doorway*. *Maxihost*'s documentation file, MAXIHOST.DOC, provides information on how to integrate the two programs.

### No-Fuss Upkeep

All that's left is to load *Maxihost*. While the program attends to callers, you can press **<F1>** to get the lowdown on system configuration and security levels. Some settings, including modem controls, can be toggled on and off from the main menu, saving you from having to reedit the configuration file.

Rules of good BBS housekeeping dictate that you periodically clean out the system log and update the user name, password, message, and upload list files. You'll also want to keep an eye on the upload directory for potentially troublesome files. Otherwise, a *Maxihost* BBS is as easy to maintain as it is to set up. ●

*Judy Getts is a contributing editor for* PC World.

**For more information about all products in this article, circle reader service no. 906.**

**WHERE TO BUY**

**Doorway 2.05**
c/o Morsholl Dudley
406 Monitor Ln.
Knoxville, TN 37922
615/966-3574 (BBS)
LIST PRICE: registration $30
REQUIREMENTS: 50K, DOS 3.0 or later version
**Reader service no. 603**

**Maxihost**
c/o Don Monkin
231 Morket Pl. #353
Son Romon, CA 94583
415/831-2370, 209/836-2402 (BBS)
LIST PRICE: businesses $50, noncommercial users $25
REQUIREMENTS: 256K, DOS 3.0 or later version
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**TheDraw 3.3**
TheSoft Programming Services
1929 Whitecliff Ct.
Walnut Creek, CA 94596
LIST PRICE: $15
REQUIREMENTS: 150K, DOS 2.0 or later version
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## USER GROUP TIPS

**Helpful hints from members of the nation's user groups**

### ASCII Characters as Easy as 1-2-3

*1-2-3* doesn't make it easy to use the PC's extended ASCII character set, preferring its own LICS (Lotus International Character Set). Here's how to make release 2.2 use extended ASCII characters.

Type **install** at the DOS command line, and press **<Enter>**. Select *Advanced options*, then *Modify current driver set Text display*. From the large list of display options presented, select *Universal text display -ASCII-no LICS*. Next, select *Return to menu Save changes*. If you wish, type in a new name for the changed driver set. Then press **<Enter>** twice and select *Yes* to exit Install.

If you saved your driver set under a new name, load *1-2-3* with **123** *drivername*. Use the @Char() function to display a character; for instance, **@char(218)** will produce ⌐.

For an on-screen reference of ASCII characters and their codes, select */Data Fill*, enter a range of **b1.b223**, a start of **33** (characters 1 through 32 are not displayed in *1-2-3*), a step of **1**, and a stop of **255**. With the cell pointer at A1, type **@char(b2)** and press **<Enter>**. */Copy* the contents of 'a1' to **a2.a223**. Printing this worksheet will show you which of these characters your printer supports.

*Frank Miyazaki*
*Borderline IBM*
*PC Users Group*
*Bellingham, Washington*

### Return of the PC-File Clones

Bob Levine's method of duplicating *PC-File+* data base formats [*User Group Tips*, October 1989] works well, but there's a simpler way. An easier method uses DOS's COPY command. *PC-File* keeps a data base's structure as a separate file with an HDR extension. If you COPY the HDR file, giving it a new name with the same extension, *PC-File* will see the new HDR file as an empty data base with the same structure as the original.

*Bobby Swain*
*VAPCF Users*
*Christiansburg, Virginia*

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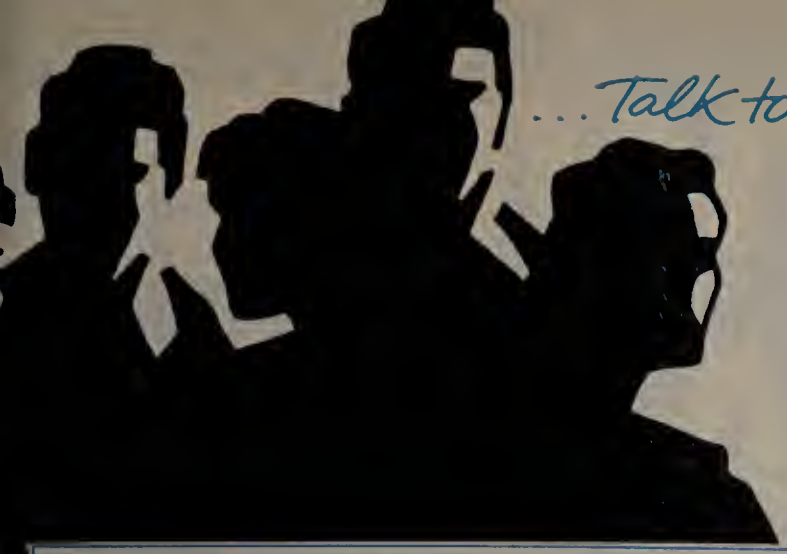

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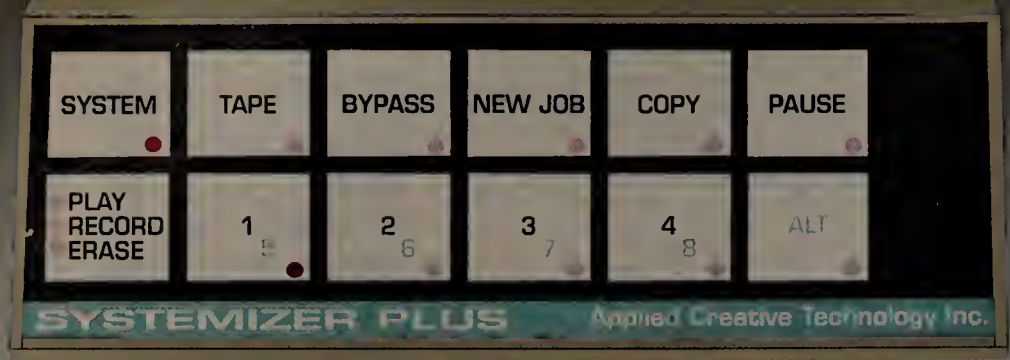
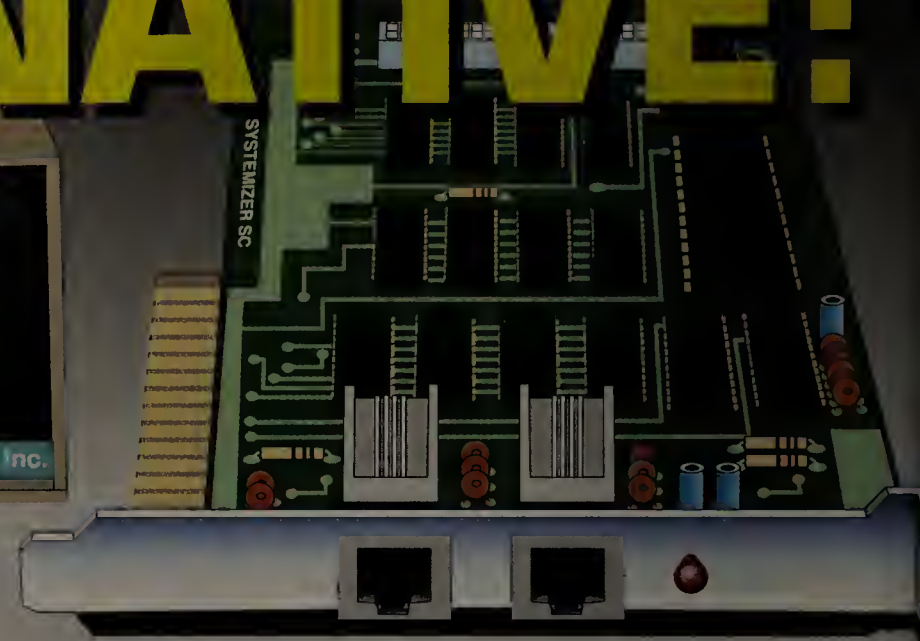
*Systemizing...*

# THE NETWORK ALTERNATIVE!




Several models available. The **Systemizer Plus**® shown above is an externally mounted networking module. Because it's self-contained and requires no software in the computer, it can work with practically any computer, operating system and application program.




Or use the internally mounted **Systemizer SC**, a slot-card version of the Systemizer Plus.® For MS-DOS®PC's and compatibles. The SC and Sys+ can be used in the same network, as shown in the diagram below.

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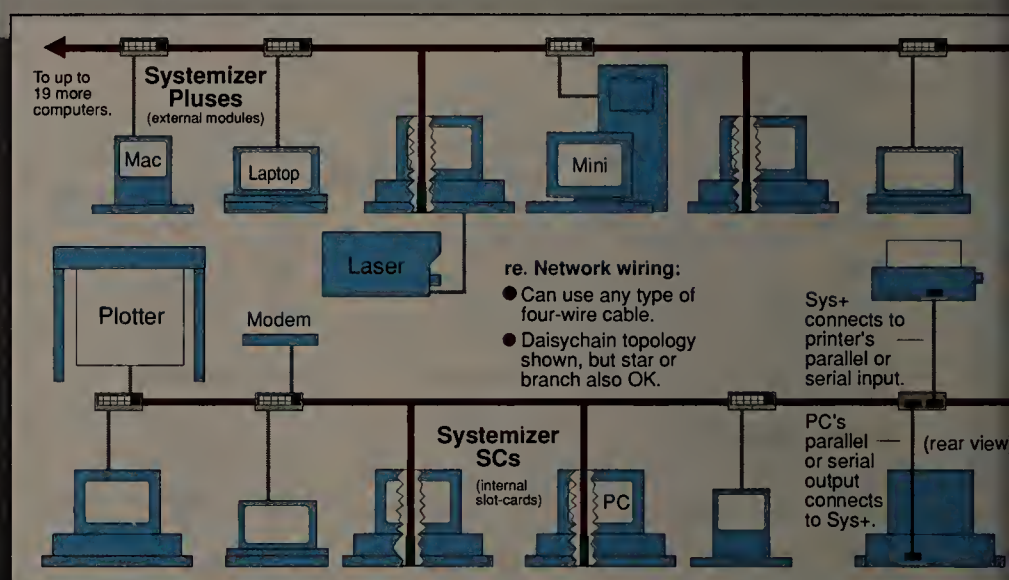
- Share a Modem
- Exchange E-MAIL
- Exchange Data




Example Systemizer network consisting of 11 micros *and* a minicomputer, sharing 3 printers and a modem via a mixture of Systemizer Pluses and Systemizer SCs. Note: though not shown here, some of the computers could also be connected to a traditional LAN or WAN.

Systemizing is a distributed processor approach to networking, consisting of internally or externally mounted modules. It is a time-tested, proven alternative to LANs, and has become the connectivity standard at many of the world's largest corporations and throughout the federal government. Tens of thousands are already in use. Why? Because Systemizing delivers what 95% of corporate computer users want from a LAN, without the costs and complications normally associated with networking.

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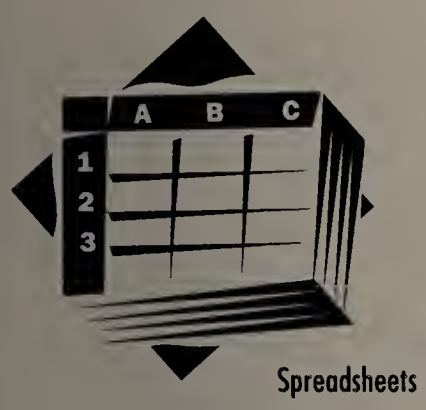
**Circle 34 on reader service card**

# Spreadsheets (A..Z)




**Practical tips for building better worksheets**

This month: getting started with Allways

*Richard Scoville*

As a PC educator, I'm distressed by the growing spreadsheet "gadget gap." The programs get ever more powerful and complicated, and while these advances are vital for a few complex projects, most spreadsheet users benefit far more from simple tricks and techniques that ease everyday tasks. Face it: Most of us are less concerned with matrix algebra and radar charts than with getting the right answers quickly.

In this column, we'll focus on practical ways to build better spreadsheets. Given its market domination, *1-2-3* will claim the lion's share of our attention, but we won't overlook other programs. Each month we'll also feature a useful *Excel* tip and take a look at a different spreadsheet utility or add-in.

### Allways Prepared

Printing reports was once the bane of *1-2-3* users, who struggled with baffling page breaks, arcane setup strings, and mysterious print borders. But the situation improved two years ago, when Lotus started bundling Funk Software's *Allways* with *1-2-3*.

*Allways* lets you combine text and graphs in reports, which you can dress up with fonts, lines, shading, boldface, underlining, and color. Equally important, it saves time and paper by showing you how your reports will look before you print them out (though it doesn't show page headers or borders).

To get you started with *Allways*, we'll go step-by-step through a make-over of the "before" worksheet shown in **FIGURE 1**. The result will be the flashy "after" report of **FIGURE 2**.

If you haven't yet installed *Allways*, see your *1-2-3* or *Allways* manual for instructions. Execute the */Add-in Attach* command, select *ALLWAYS.ADN*, choose *7* to assign *Allways* to

## SPREADSHEET TOOLBOX

**Seriously Impressed**

For $150 *Impress 2* gives *1-2-3 2*.x users more report tools than *Allways* does: You can add labels, arrows, shapes, and even drop-shadows to graphs, and graphs can be hot-linked to change as your numbers do. But that's not all: *Impress* also gives *1-2-3* a terrific-looking *Excel*-like graphical interface that lets you use a mouse to move around, enter commands, select ranges, and size rows and columns.

*Impress* can wrap text as you type, and reformatting is easy. You can also change fonts and attributes within a block of text (though not so easily). *Impress* handles even complex *1-2-3* macros smoothly, but a bit slowly. However, when a macro has paused for data entry, you can't use the mouse.

*Impress* isn't going to elbow aside *Quattro Pro* or *Excel*, both of which offer easy pull-down menus, one-click row or column selection, more flexible graph editing, and a host of other advantages. But *1-2-3* users who want snazzy graphics or a mouse interface should take a close look at *Impress*.
—*R. S.*

**Impress 2** $149; PC Publishing, Inc., 1801 Avenue of the Stars #815, Los Angeles, CA 90067; 800/634-4555, 213/556-3630
**Reader service no. 650**

<Alt>-<F7>, and choose *Quit*. Then create the P&L.WK1 worksheet as shown. Next, using standard *1-2-3* commands, create a graph resembling the one in **FIGURE 2** and save it to a file as P&L.PIC with */Graph Save*.

Now you're ready to get down to work with *Allways*. Invoke it by pressing **<Alt>-<F7>**.

### Allways at Work

You typically begin creating an *Allways* report by setting overall page characteristics. To mimic the report illustrated, select */Layout Margins Left*, set the left margin to **1.5** inches, set the bottom margin to **.5** inch, and choose *Quit* to return to the Layout menu. Select *Titles Footer* and enter **:#** to center the page number at the bottom of the page, then select *Quit* twice.

Now add the shading and lines for the totals. Select */Format Shade Light*, highlight the range *A8..E8*, and press **<Enter>**; repeat for rows 18 and 20. Then move to B7, select */Format Lines Bottom*, and highlight *B7..E7*. To display just the line, reduce the height of row 7 to zero points: Select */Worksheet Row Set-height*, type **0**, and press **<Enter>**. Repeat on row 17.

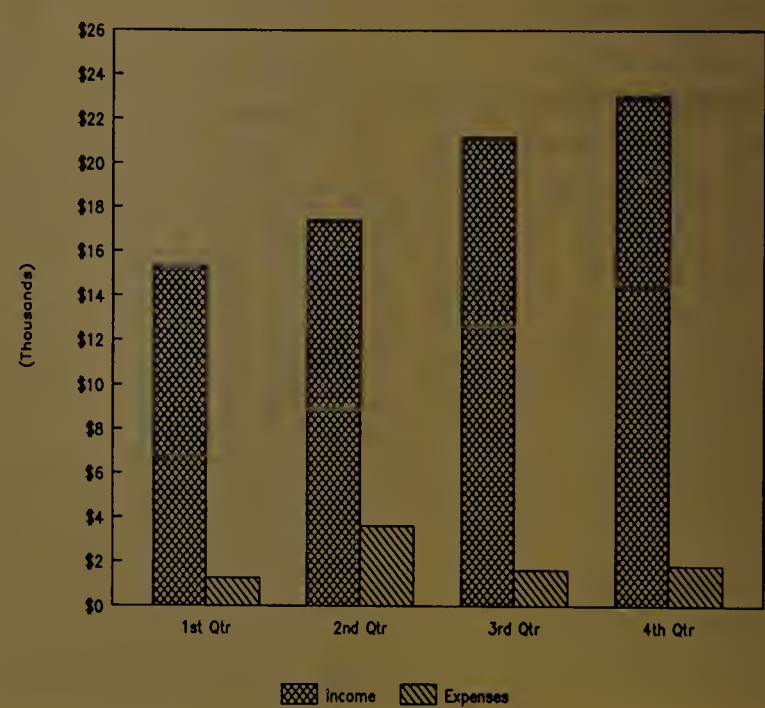
The next step is to jazz up the fonts (*Allways* lets you use up to eight in a single report). With the pointer on cell A1, select */Format Font*, highlight *Triumvirate 20 point*, and press **<Enter>**. Repeat the process on cell A2, but choose *Triumvirate 14 point*. Execute */Format Font* again, select *Times 10 point*, highlight *B4..E4*, and press **<Enter>**; repeat for *A5..A20*. To make room for these larger labels, use */Worksheet Column Set-*

| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | DIVE-BOMBERS SKYDIVING CLUB | | | | |
| 2 | Quarterly P&L Statement | | | | |
| 3 | | | | | |
| 4 | | 1st Qtr | 2nd Qtr | 3rd Qtr | 4th Qtr |
| 5 | Sales | $15,567. | $17,687 | $21,543 | $23,456 |
| 6 | Returns | 275 | 335 | 376 | 440 |
| 7 | | --- | --- | --- | --- |
| 8 | TOTAL INCOME | $15,292 | $17,352 | $21,167 | $23,016 |
| 9 | | | | | |
| 10 | Advertising | $ 250 | $ 320 | $ 450 | $ 212 |
| 11 | Auto | 277 | 277 | 277 | 277 |
| 12 | Depreciation | 527 | 527 | 527 | 1,012 |
| 13 | Legal & Professional | 25 | 456 | 143 | 75 |
| 14 | Supplies & Postage | 15 | 17 | 20 | 21 |
| 15 | Taxes | 26 | 26 | 26 | 26 |
| 16 | Utilities & Phone | 125 | 2,000 | 185 | 195 |
| 17 | | --- | --- | --- | --- |
| 18 | TOTAL EXPENSES | $ 1,245 | $3,623 | $1,628 | $1,818 |
| 19 | | | | | |
| 20 | PROFIT | $14,047 | $13,729 | $19,539 | $21,198 |

**FIGURE 1: Enter these cells in a blank worksheet before following our step-by-step instructions.**

DIVE–BOMBERS SKYDIVING CLUB
Quarterly P&L Statement

| | 1st Qtr | 2nd Qtr | 3rd Qtr | 4th Qtr |
|---|---|---|---|---|
| Sales | $15,567 | $17,687 | $21,543 | $23,456 |
| Returns | 275 | 335 | 376 | 440 |
| TOTAL INCOME | $15,292 | $17,352 | $21,167 | $23,016 |
| Advertising | $250 | $320 | $450 | $212 |
| Auto | 277 | 277 | 277 | 277 |
| Depreciation | 527 | 527 | 527 | 1,012 |
| Legal & Professional | 25 | 456 | 143 | 75 |
| Supplies & Postage | 15 | 17 | 20 | 21 |
| Taxes | 26 | 26 | 26 | 26 |
| Utilities & Phone | 125 | 2,000 | 185 | 195 |
| TOTAL EXPENSES | $1,245 | $3,623 | $1,628 | $1,818 |
| PROFIT | $14,047 | $13,729 | $19,539 | $21,198 |




-1-

**FIGURE 2: Our Allways make-over transforms FIGURE 1 into this attractive, laser-printed report.**

# The price is beautiful too.

Any way you look at it, this is an attractive monitor.

Introducing the Amdek AM/738 SMARTSCAN. It has a 14" screen with EVGA resolution (1024 x 768) capable of displaying an unlimited number of colors.

A razor sharp .31 mm dot pitch keeps everything from graphics to type amazingly clear and in fine detail. And a larger viewing area, thanks to high resolution, means less scrolling and more productivity. So the AM/738 will do a beautiful job with today's graphics software. As well as tomorrow's.

Add the AM/138 video card and you also get autosizing and a virtually flicker-free screen.

All for a very competitive price.

Of course, that should come as no surprise. Because the AM/738 is made by Amdek, a company with 13 years experience in the computer monitor business.

The new Amdek AM/738 SMARTSCAN. Its screen is beautiful. But its price is even more appealing. For the dealer nearest you, call 1-800-PC AMDEK.

AMDEK

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**Circle 35 on reader service card**

# MORE FREEDOM OF INFORMATION!

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PC WORLD


## EXCEL SHORTCUTS

### Projecting Future Values

***Ralph Soucie***

*Excel*'s TREND() function uses statistical techniques to make projections based on actual values in a worksheet. It's most useful when you've recorded results over a period of time and want to predict future results.

To try TREND(), enter the sample sales figures below into an *Excel* worksheet.

| | A | B |
|---|---|---|
| 1 | Aug-89 | 17534 |
| 2 | Sep-89 | 15860 |
| 3 | Oct-89 | 16971 |
| 4 | Nov-89 | 19895 |
| 5 | Dec-89 | 22458 |
| 6 | Jan-90 | 21682 |
| 7 | Feb-90 | 19143 |
| 8 | Mar-90 | 18657 |
| 9 | Apr-90 | 20715 |
| 10 | May-90 | |
| 11 | Jun-90 | |
| 12 | Jul-90 | |

Select the range *B10:B12*, type the formula =**TREND(b1:b9,a1:a9, a10:a12)**, and press **<Ctrl>-<Shift>-<Enter>** to enter the formula as an array. Projected values for the next three months appear in cells B10:B12. The first argument of the TREND function, B1:B9, points to the actual figures; the second, A1:A9, selects labels for those figures; and the third, A10:A12, selects labels for the projected values.

*Ralph Soucie is a contributing editor for* PC World.

*width* to adjust the width of column A to **20** characters.

Now insert the graph you've created into the *Allways* report. Position the cell pointer on B21, select */Graph Add*, choose *P&L.PIC*, highlight the range *A21.E46*, and press **<Enter>**. If instead of your graph you see just a gray box, select */Display Graphs Yes Quit*. Note that this graph is not dynamically linked to your spreadsheet data. When you change the spreadsheet, you must update the PIC file with */Graph Save* and update *Allways* with */Graph Settings PIC-file*, or else the graph in your *Allways* report will be inaccurate.

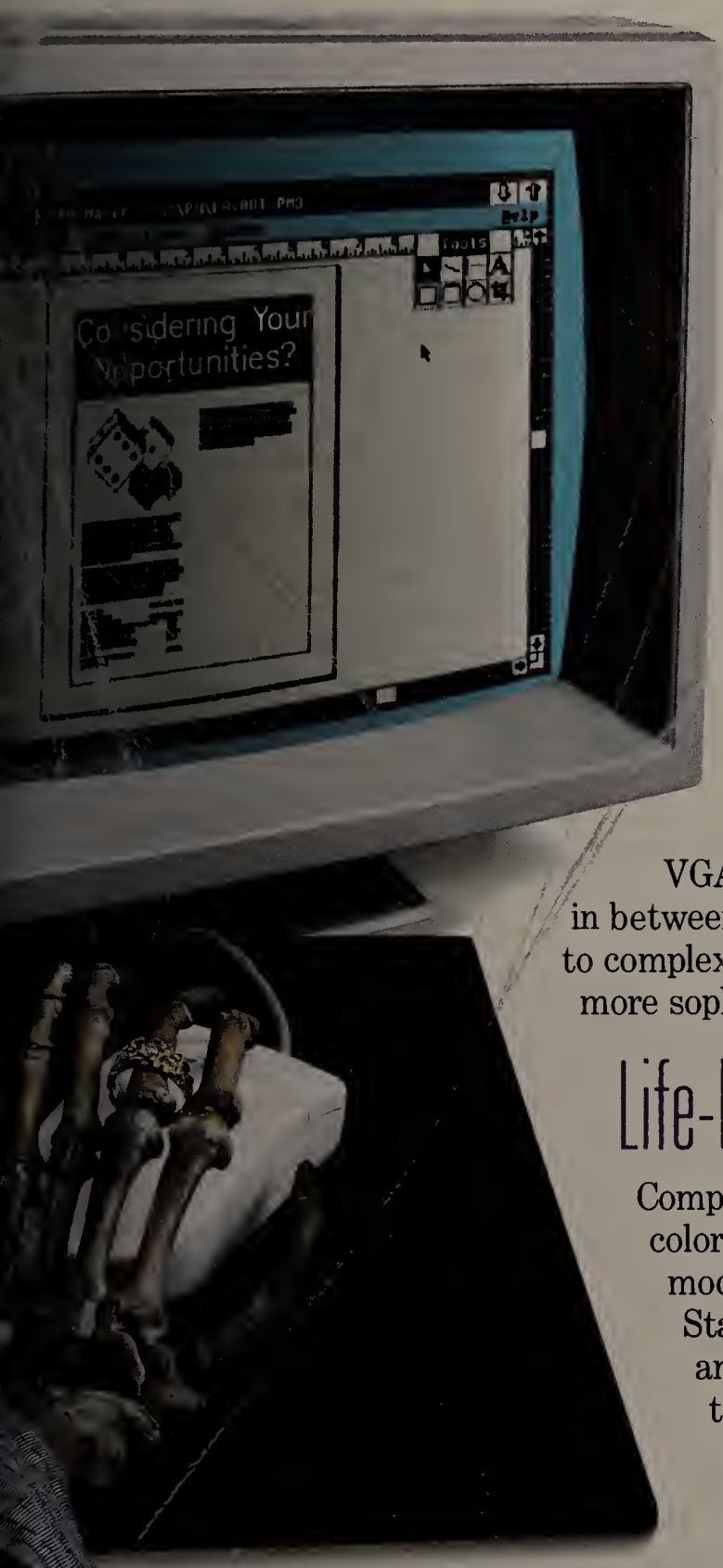
Finally, print your masterpiece. Select */Print Range Set*, highlight *A1..E46*, and select *Go* to send your report to the printer.

Pretty easy, wasn't it? Novices may want to read through the steps again and review the *1-2-3* manual, especially on the subjects of print borders and headers and footers. ●

*Richard Scoville is a contributing editor for* PC World.

# The New Hercules Graphics Station Card

**Introducing the Hercules Graphics Station Card. With more features than any card in its class. And more power. The company that took the monotony out of monochrome now puts more zip into analog monitors.**




## Fast Graphics

In today's competitive business world, time is more precious then ever. But Windows applications like PageMaker, Excel, and Corel Draw can make you wait while they work. Not with the Hercules Graphics Station Card—it'll run Windows up to five times faster than a regular VGA card. At higher resolutions, too.

The secret is the on-board Texas Instruments 34010 graphics processor. It frees the CPU from the drudgery of graphics functions and screen memory control so you won't have to wait for your screen to catch up with you.

## From VGA on UP

A whole megabyte of video memory lets the Hercules Graphics Station Card offer a full range of modes—from VGA up to 1024 x 768 resolution with 256 colors, and plenty in between. So it will run all your software—from general business to complex design programs. And as your software needs become even more sophisticated, you won't need to shop for a new video card.

## Life-like Images

Computer images can look realistic when software can access more colors. The 16- and 24- bit color modes on the Hercules Graphics Station Card allow any standard analog monitor to display up to 16.7 million colors for high quality photo-realistic images.

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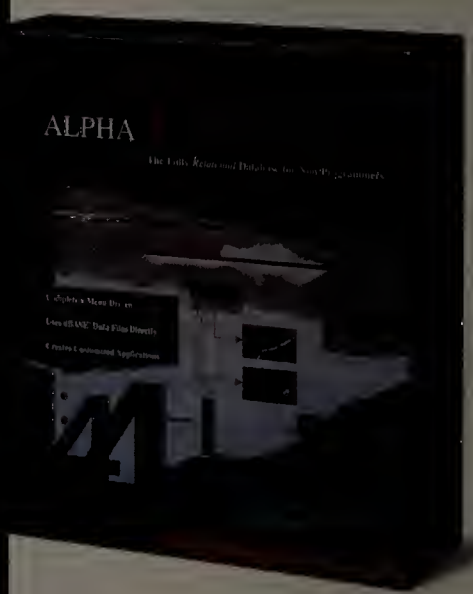

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**Circle 37 on reader service card**

# Words Into Print

Word Processing

**Tips for getting the most out of your word processor**

This month: Design snaking columns with WordPerfect

*George Campbell*

Everybody wants to be the master of their word processor, but few people really are. Who has the time to learn all the features of a *WordPerfect* or a *Word?* As programs and manuals grow more complex, the going gets rougher.

*Words Into Print* will cut through the clutter and give you the information you'll need to produce high-impact documents quickly. In future columns you will find tips for creating style sheets, organizing dictionaries, downloading fonts, and more. Usually, *WordPerfect* will be the example program, but the lessons should be helpful with other programs as well.

Each month you'll also find tips and macros for *Word* and *WordPerfect*, and I'll answer letters about your toughest word processing problems. In your letter, describe the problem in detail, and include the name and version of your software and a daytime phone number. *PC World* will pay $25 for each published letter. Send your questions to *Words Into Print, PC World,* 501 Second St., San Francisco, CA 94107, or to CompuServe (71571,222). To start the ball rolling, here are some tips on using columns in *WordPerfect.*

**Multiple-Column Magic**

Putting more than one column on a page can add impact to documents. Columnar text is easy to read, and it lends itself well to integrated text boxes and graphics. *WordPerfect* supports both snaking, newspaper-like columns, where text flows from column to column, and parallel

## WORDPERFECT SHORTCUTS

### Easy File Conversion

*George Beinhorn*

Follow these steps to create a *WordPerfect 5.1* macro that converts files from other word processors' formats:

1. Press **<Home>** **<Ctrl>**-**<F10>**, and type **convert**.
2. Press **<Enter>**, type a description, and press **<Enter>** again.
3. Press **<Delete>** to erase the {Display Off} code.
4. Press **<Ctrl>**-**<F1>** to add a {Shell} code.
5. Type **cconvert** to call up the conversion program.
6. Press **<Space>**, and type a path to the directory where you would normally find the files to be converted. For example, to convert *Word* files, you might type **c:\word\docs**.
7. Press **<Ctrl>**-**<Page Up>** to see the command list, move the cursor to {PAUSE}, and press **<Enter>**.
8. Press **<Space>**, and type a path for the output files.
9. Press **<Ctrl>**-**<Page Up>** **<Enter>** to add another {PAUSE} code.
10. Press **<Space>**, and type an input file code for the foreign word processing format; for example, type **b** for *Word.* See page 93 of the *WordPerfect 5.1* manual for a list of codes.
11. Press **<Ctrl>**-**v** **<Enter>** **<F7>** to save the macro.

To convert a file, press **<Alt>**-**<F10>**, type **convert**, and press **<Enter>**. Type the input and output file names, pressing **<Enter>** after each.

*George Beinhorn is a freelance writer in Nevada City, California.*

## WORD SHORTCUTS

### Creating a Column Macro

Many of the tips that will appear here in the coming months will involve the creation of *Word* macros. Here's how to create a macro that formats a *Word 4.0* or *5.0* document in snaking columns:

On a blank *Word* screen, type the following without pressing <Enter>. Type the actual characters, not the keystrokes they indicate:

**<ctrl esc>fdl<tab>**
**«pause Enter the number of columns»**
**<enter>**

*Word* encloses macro keystrokes in angle brackets (< >) and commands in chevrons (« »). To type the chevrons, press **<Ctrl>**-[ and **<Ctrl>**-].

When you finish, press **<Shift>-<F10>** to select the macro, press **<Esc>c**, and enter a name for the macro (for example, **snake.mac**). If you want to assign it to a keystroke, type a caret (^) and press a <Ctrl>-*key* combination.

Test the macro and, if it works, press **<Esc>tgs<Enter>** to save it. If you need to edit the macro, load it onto a blank screen by pressing **<Esc>i**. Type the macro's name followed by a caret (^), and press **<Enter>**. After editing the macro, save it as described above.
—*G. C.*

columns, in which blocks of text sit side by side but flow independently from page to page. This exercise focuses on snaking columns.

To start, open a text file, and move the cursor to where the first column should begin. Press **<Alt>-<F7>13** to open the Column Definition menu. The default column type is Newspaper, so you can skip the first entry. To enter the number of columns, press **2**, then type **3** to select three columns, and press **<Enter>**. You can use up to 24 columns, but beyond 4, the text becomes hard to read.

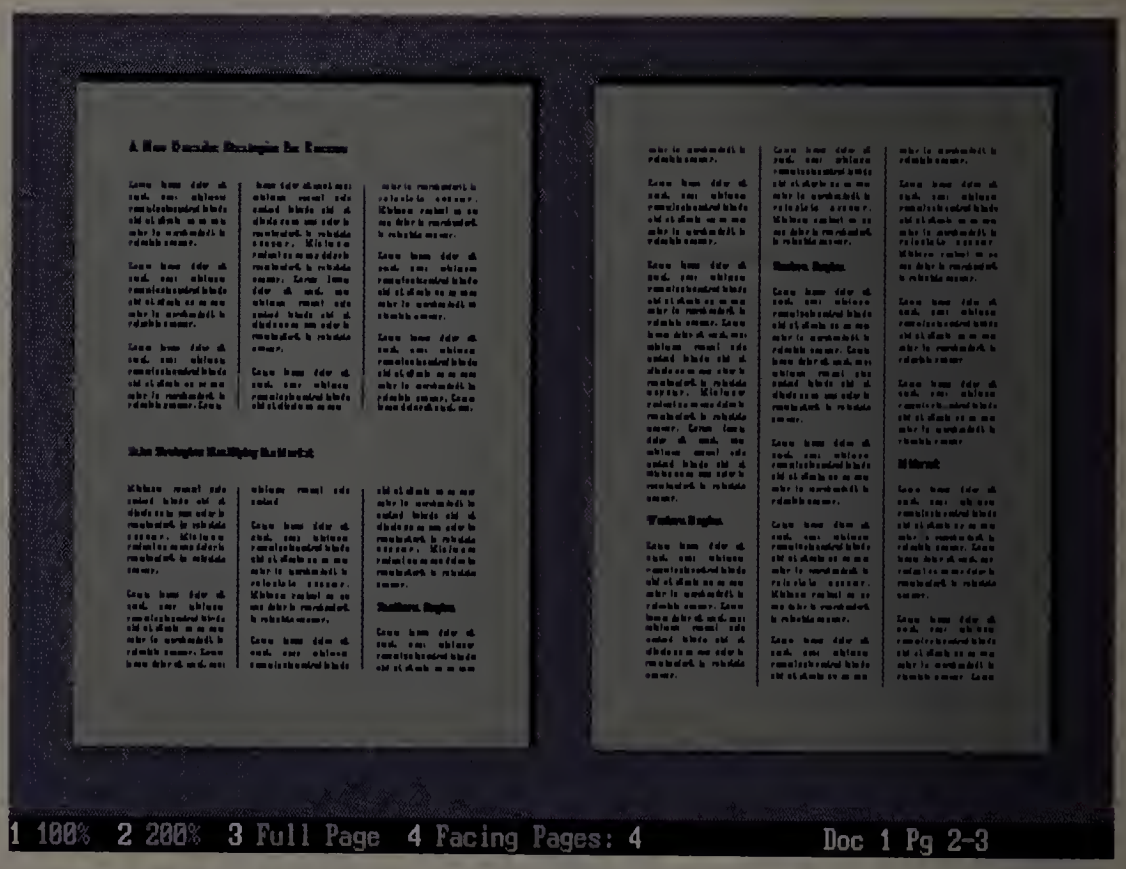
You can opt to skip the remaining entries, as the half-inch default for the width between columns is perfect for a three-column format, and there's no need to change the column margins. If you want to, however, you can set unequal column widths here, a feat impossible in most word processors.

Press **<F7>** and then **1** to save the settings and turn on the columns. If you press **<Cursor Down>**, the text should appear in columns on screen. If it doesn't, press **<Shift>-<F1>267y<F7>** to turn on the column display mode, and press **<Cursor Down>** again to refresh the screen.

You can continue editing the text as usual. To move from column to column, press **<Ctrl>-<Home>** and then the left or right cursor key. With *5.1*, mouse users can simply click on a new spot.

### Turn-Ons and Turnoffs

In some documents you'll want to change from multiple columns to another format, such as when you add a full-width headline. To turn off column formatting, move the cursor to the start of a new line and press **<Alt>-<F7>12**. If you don't place the cursor at the start of a line, *WordPerfect* will push you to the next page. Next, enter a headline, press **<Enter>**, and then press **<Alt>-<F7>11** to turn the columns back on.




**As this WordPerfect page preview shows, using multiple snaking columns in a document can enhance readability and boost impact.**

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_____
*ZCM-1492 MONITOR*
Serial No.:
_____

*See your Medallion Reseller for additional savings certificates when buying more than two qualifying PCs

1. Zenith Data Systems' SX Appeal Promotion is valid on purchases made at participating ZDS Resellers in the United States and Canada between March 5, and June 1, 1990 only.

2 During this time period, any eligible ZDS product purchased from a participating ZDS Reseller qualifies the buyer for $200 U.S. off in the United States, or $200 Canadian off in Canada, the price of a ZCM-1492 Flat Technology Monitor when the monitor is purchased at the same time. The $200 reduction must be taken at the time of purchase.

3. Eligible ZDS products include Z-386 SX, Z-386/20, Z-386/25, and Z-386/33, Z-386/33 E desktop systems, and SupersPort® SX, SupersPort 286e, and TurbosPort® 386e laptop systems only.

4. At the time of purchase, the buyer must provide the participating ZDS Reseller with a completed and signed savings certificate. Savings certificates are available on SX Appeal counter cards at participating ZDS Reseller locations, or through promotional advertising and direct mail.

5. Any number and combination of eligible ZDS products may be purchased. Each purchase must be accompanied by a correctly completed and signed savings certificate prior to receiving the $200 price reduction for each corresponding Flat Technology Monitor purchased.

6. To be reimbursed for the $200 price reduction in the United States* on qualified Flat Technology Monitor sales, participating ZDS Resellers must provide Zenith Data Systems with the completed and signed savings certificate. The certificates must be mailed to Zenith Data Systems, postmarked no later than midnight June 22, 1990, to:

Zenith Data Systems SX Appeal Offer
c/o CMA Marketing Services
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Mahwah, NJ 07430

*For information on Canadian reimbursement call (416) 231-4171.

7 Zenith Data Systems is not responsible for late, lost, misdelivered, illegible, damaged, incomplete, stolen, or postage-due mail even if proof of mailing exists.

8. This offer is not valid on special units sold to ZDS Resellers for demonstration purposes, units sold by participating Resellers to any third-party reseller; or desktop or laptop units purchased by end users direct from Zenith Data Systems.

9. Zenith Data Systems will track product serial numbers submitted with savings certificates to verify authenticity. Payment will be denied for certificates submitted on ineligible units. ZDS reserves the right to request end-user sales invoices, ZDS product purchase invoice, and whatever other information which may be required as proof of purchase to verify coupon redemption eligibility.

10. This offer is not valid at Educational Resellers; $200 savings is already applied to education list price.

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***"And it's even more appealing when I can save $200 right now."***

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**Circle 290 on reader service card**

The problem with changing columns in midpage is that the columns aren't balanced. The only way to format equal-length columns that are on the same page as other column formats is to balance them by eye. To do this, move the cursor to the point where you want to start a new column, and press <Ctrl>-<Enter>. This forces the text to the top of the next column. Then press <Ctrl>-<Enter> again at a new point to start the third column. To determine the right break points, you can count the number of lines in the text to be balanced and divide by the number of columns. Don't balance the columns until you've completed all your other editing and formatting.

**Separating Columns With Lines**

If you want, you can enhance readability by adding vertical lines between columns:

1. Press <Alt>-<F9>5 to open the Graphics Line menu.
2. Press 2 for Vertical Lines.
3. Press 1 to select Horizontal Position, then 3 for Between Columns.
4. At the prompt, press <Enter> to place the line after the first column. To place a line after the second column, repeat these steps but press 2<Enter> for the second line.
5. If you're using multiple formats, you'll also have to specify the lines' vertical positions and lengths. For example, to create a line starting at the top of the page but ending at the bottom of a short column, select *Top* for the Vertical Position field, and enter the length of the line in the Length field. To find out the length of the line, return to the editing screen; move the cursor to the last line of the truncated column, and check the inch counter at the bottom right of the screen. To view the lines, press <Shift>-<F7>6, which turns on the page preview mode.

Once you set the columns, you can still edit using the normal tools. The only exceptions: You can't include footnotes or *5.1*'s tables inside a column. It's a small price to pay for a polished page. ●

*George Campbell is a contributing editor for* PC World.

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**PC WORLD**

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Many products claim to have a few XTree-like features. But there's really only one way to get the rich set of features found in XTreePro Gold.™ And there's only one way to receive the award-winning features and performance that made XTree® the industry standard.

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# Data Basics

Data Management

**Tips and techniques for managing your data**

This month: how and why to design a relational data base

*Alan Schwartz*

Welcome to *Data Basics*, *PC World*'s new column on the fundamentals of relational data bases. In the coming months, you'll learn how to build efficient, error-free data bases, design effective forms and reports, and perform other data management tasks. Although the examples in this column use the still very popular *dBASE III Plus*, users of other data managers should also find *Data Basics* useful. This month's column looks at the basics of designing relational links.

### Why Relational?

Why use a relational data base? Say you're tracking tool rentals for Acme Home and Garden Tool Supply. If you put data regarding customers, transactions, and tools in a single table, you're asking for trouble. Adding a record for each customer and each of the tools rented involves entering the same data over and over, which wastes time and disk space. Also, a single table leaves no room for human error—if a customer's middle initial is entered one day but not the next, you can't generate accurate reports. And if you add multiple tool fields to each transaction, you'll have trouble reporting by tool. The solution is to keep customers, transactions, and products in separate tables and place relational links between them.

When two tables have a relational link, moving to a different record in one table (the parent) causes a matching record to be selected in the other (the child). This way, while you're working on a particular transaction, the current record in the customer table will always contain data for that transaction's customer. The relational link requires that the two tables share some data in common, typically—although not necessarily—a single field.

In *dBASE*, where each table is its own data file, you could name the tables CUSTOMER.DBF, TRANS.DBF, and PRODUCT.DBF. Before a relation can be set, the child data file must be indexed on the field that will link it to the parent. The actual link is then created using the SET RELATION command. For example, to build a relationship from TRANS.DBF to CUSTOMER.DBF, you would enter commands similar to the following, assuming that both data files

## DATA BASE TOOLBOX

**Qedit**

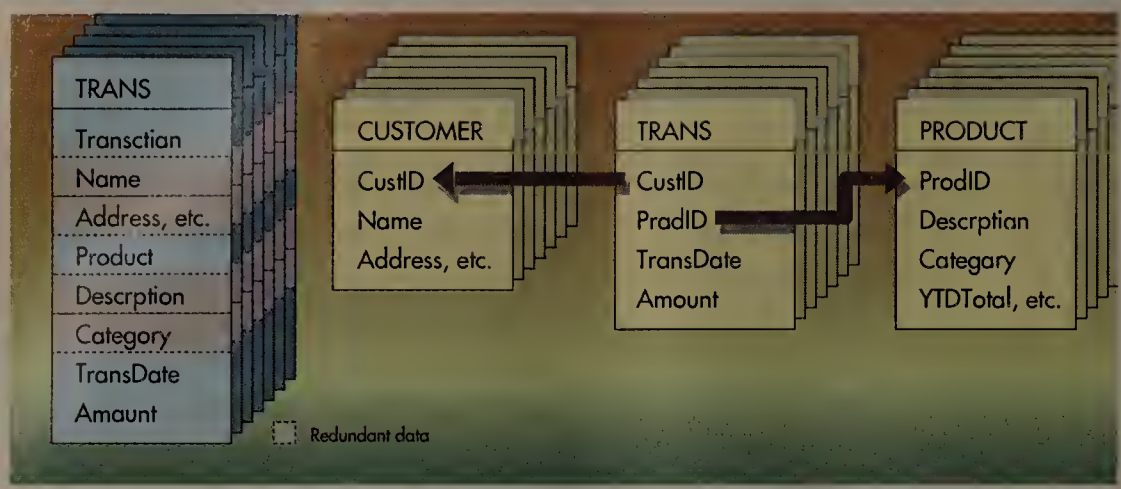
*dBASE III Plus*'s internal text editor is notoriously primitive and unfriendly, so many users look elsewhere for an editor they can run inside *dBASE* for work with both memo fields and PRG (program) files.

SemWare's *Qedit*, a 48K shareware text editor that loads instantly, is lightning quick, and works great inside *dBASE*. *Qedit*'s block operations include copying, moving, printing, capitalization, and indentation. The program draws lines and boxes, has an undo feature, and handles up to eight files at a time. Macros, pulldown menus, and keyboard reconfiguration make *Qedit* easy to learn and use.

With the manual, *Qedit* costs $54.95 plus $3 shipping; without, it's $44 plus $1.50. It requires 128K and DOS 2.0 or a later version. SemWare, 4343 Shallowford Rd. #C-3, Marietta, GA 30062-5003; 404/641-9002. —*A. S.*

**Reader service no. 601**

## Smart Design Means Data Base Power




**Trying to put all your data in one table (left) results in redundant data entry. It's better to organize data into different tables and use relational pointers to link them.**

have identical fields called CustID:

```
SELECT 1
USE Customer INDEX Custid
SELECT 2
USE Trans INDEX Transcust, Transprod
SET RELATION TO CustID INTO Customer
```

Then, every time you went to a different transaction, the current customer record would be the one whose CustID field was identical to the current transaction's CustID field. Thus, the command **? CUSTOMER->Name** returns the name of the current transaction's customer. This principle applies to all data base activities, including work with screens, lists, and reports.

The fields used for linking tables need not have the same name, nor must their data always be 100 percent identical. *dBASE*'s Exact option is one way to control how precisely these fields must match. With Exact off (the default), a transaction with a CustID of 'AC-1' could bring up a customer whose CustID was 'AC-12'; Exact on would produce only an exact match. Whether you should have Exact on or off depends on the situation, but you should always be aware of its status. You turn Exact on or off with **SET EXACT**.

To include the customer name and the product for each transaction, you'll need to set relations from TRANS into both other files. *dBASE III Plus* allows only one relation per parent, but it can be tricked into thinking one file is the parent when actually another is, as shown here:

```
SELECT 3
USE Product INDEX Prodid
SELECT Customer
SET RELATION TO Trans->ProdID INTO ;
   Product
SELECT Trans
SET RELATION TO CustID INTO Customer
```

## PARADOX SHORTCUTS

### Exporting Fixed-Length ASCII Files

*Celeste Robinson*

It's sometimes convenient to turn your data into a fixed-length ASCII file, resembling a table layout. Unfortunately, *Paradox*'s Tools ExportImport commands won't let you do that unless each record contains only a single field. Fortunately, there's a workaround—you can export text to a fixed-length ASCII file by generating a report.

1. From the main menu, select *Report Design*, pick your table, and enter a report number. Select *Tabular*.

2. Delete all lines from the report specification except the one containing field masks, shown with *9*s for digits and *A*'s for characters. To delete a line, place the cursor at the beginning of the line, and press **<Ctrl>-Y**.

3. Press **<F10>**, select *Setting PageLayout Length*, press **<Backspace>** twice, and press **C <Enter>** to set page length to continuous.

4. Press **<F2>** to save the report specification.

5. Select *Report Output*, and select the table and report specifications created in step 1. When prompted for the destination of the report, choose *File*. Enter a file name, and that's it!

*Paradox* can't import fixed-length text files, but Borland provides a separate utility for that job. Flimport, which comes on Pprog disk 6 in *Paradox 3.01* and later versions, easily does the trick. If you have an earlier version, you can call Borland technical support at 408/439-1236 for a free copy.

*Celeste Robinson, a writer and* Paradox *consultant living in the San Francisco Bay Area, is the author of* The Best Book of Paradox *(Howard Sams and Company, Carmel, Indiana, 1990).*

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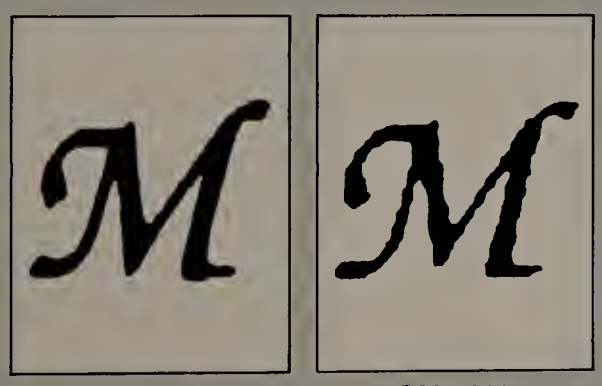

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# EasyFlow

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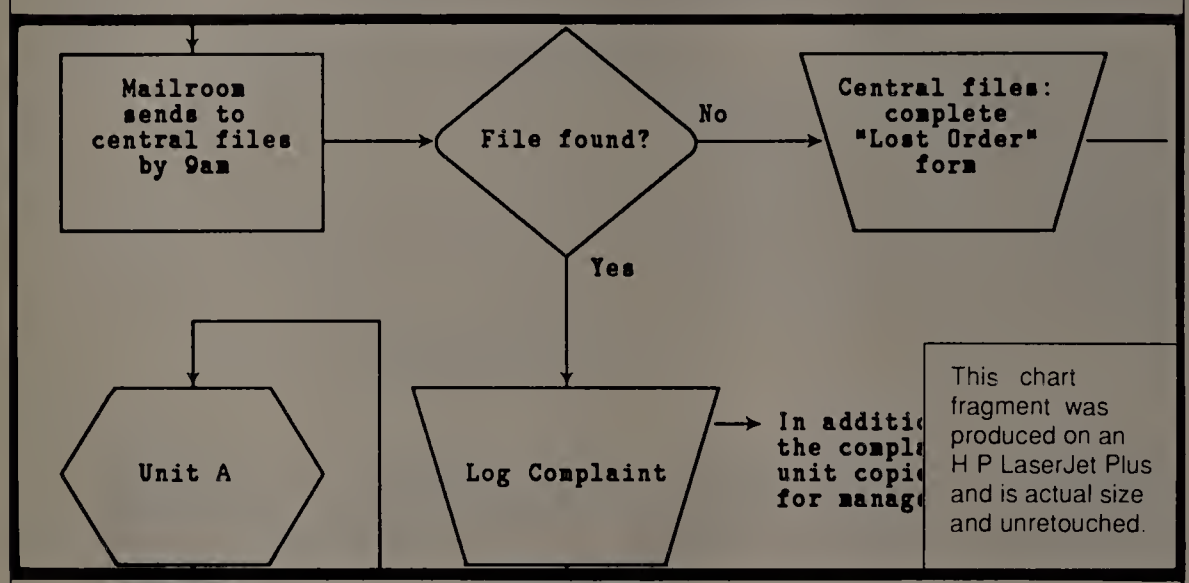


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**Circle 79 on reader service card**


For all practical purposes, TRANS is the parent in both relations. But since the relation to PRODUCT is set while the CUSTOMER data base is selected, *dBASE* allows a second, more conventional relationship between TRANS and CUSTOMER.

Such trickery isn't needed in *dBASE IV, Foxbase, FoxPro,* or *Clipper.* Those programs allow multiple relations to be set in one command, as in **SET RELATION TO ProdID INTO Product, TO CustID INTO Customer**, making any of them a better tool for setting up relations.

Of course, people often rent more than one tool at a time, requiring a one-to-many relationship between TRANS and PRODUCT. But we'll save that discussion for another time. ●

*Alan Schwartz is a partner in Micromega Systems in San Francisco, specializing in custom data base application development.*

## POWER TIP NO. 101

### Don't Touch That Mouse!

Although *Windows* is fond of mice, don't roll your mouse around while the environment is loading. This sends the system into a tizzy, and when the MS-DOS Executive appears, the mouse pointer jumps wildly around the screen. You'll have smoother starts if you keep your hands off until the Executive is up.

*Robert Luhn*
*Senior Editor*

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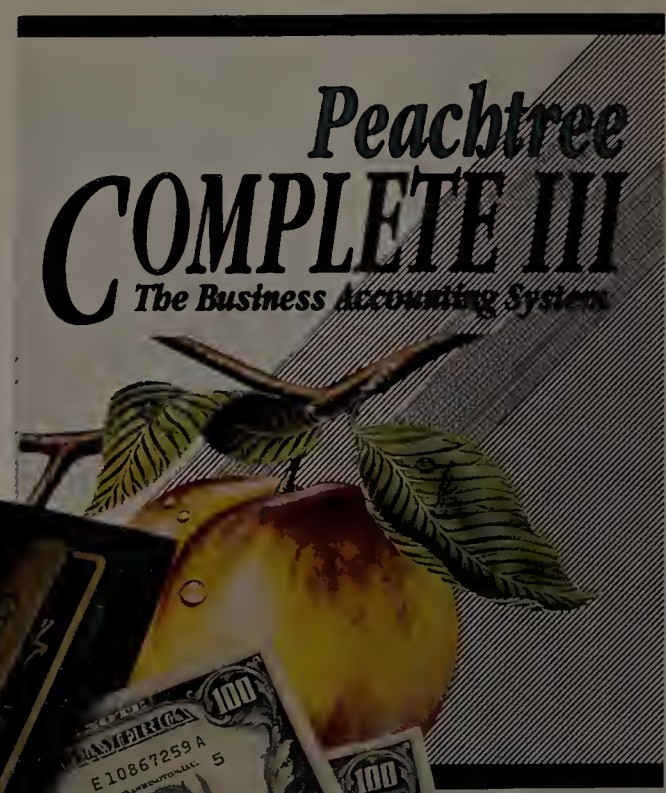


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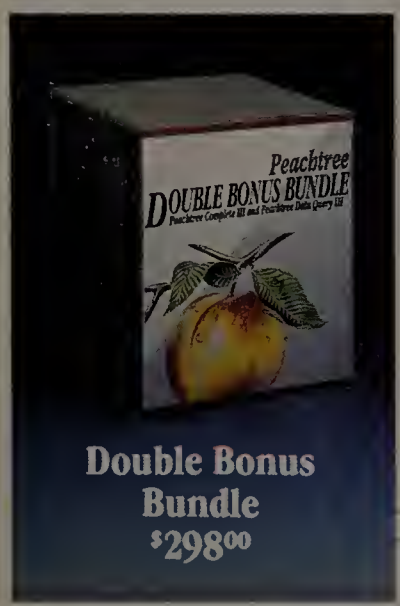


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# The Art of Persuasion

Publishing and Graphics

**Expert advice for creating high-impact documents and presentations**

This month: Avoid the gray-page syndrome, and set custom page sizes with Ventura.

***Richard Jantz***

These days, if a business document lacks typeset-quality polish or graphics pizzazz, it simply won't be remembered—or even read. But if you're among those who are expected to churn out tantalizing newsletters, reports, and slides, you know how hard it is just to meet a deadline, let alone produce attractive output.

The purpose of *The Art of Persuasion* is to teach you how to produce compelling documents and presentations—in terms you won't need a graphic arts degree to understand. The tips and techniques presented here will focus on popular desktop publishing applications like Xerox's *Ventura Publisher* and Aldus's *PageMaker*, as well as widely used presentation graphics packages such as Lotus's *Freelance*. But even if you use different software, the underlying design principles should still apply.

In the months to come, we'll examine topics such as the proper use of fonts, scanning and manipulating graphics, formatting long documents, and handling type. We'll also provide tips for mastering business graphics,

## NUTS & BOLTS

### Customizing Page Size in Ventura

Like all desktop publishing programs, *Ventura Publisher* provides a standard selection of page sizes for producing different-sized documents. But you can also create custom page sizes using *Ventura*'s Sizing & Scaling option. This allows you to use the crop-marks feature to indicate where to trim pages. You can also print text or graphic elements that extend, or *bleed*, off the edge of the page—giving your document greater visual impact.

Here's how to create a customized 5.5-by-8.5-inch page size for use in a typical documentation binder. You'll reduce the size of the page frame (the printable area) and center it on an 8.5-by-11-inch page:

1. Open the Chapter menu and select the *Page size & layout* option. Make sure the document is set for a letter-sized (8.5-by-11-inch), double-sided format with portrait orientation.

2. Select *Frame* mode. Open the Frame menu and choose *Sizing & scaling*.

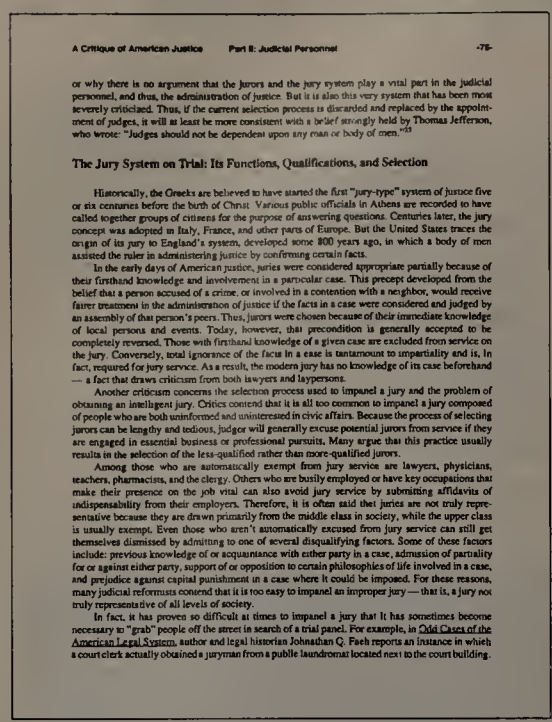
3. Enter **05.50** inches for Frame Width and **08.50** inches for Frame Height.

4. To offset the page frame from the left side of the paper, enter **01.50** inches for Upper Left X. To offset it from the top, enter **01.25** inches for Upper Left Y. The page frame is now reduced to a 5.5-by-8.5-inch page and centered in the middle of the paper.

5. When you're ready to print the pages, select the Print option's *Crop marks: On* setting, and *Ventura* will print four sets of crop marks.

If you want to create a bleed effect, just move the frame that contains the graphics or text until it overlaps the edge of the 5.5-by-8.5-inch page. Or, you can use the Graphic mode's box-text tool to contain the overlapping text. In either case, any text or graphics that extend over the boundary of the reduced page will print to the edge. —*R. J.*

# Getting Out the Gray


A Critique of American Justice Part II: Judicial Personnel -75-

or why there is no argument that the jurors and the jury system play a vital part in the judicial personnel, and thus, the administration of justice. But it is also this very system that has been most severely criticized. Thus, if the current selection process is discarded and replaced by the appointment of judges, it will at least be more consistent with a belief strongly held by Thomas Jefferson, who wrote: "Judges should not be dependent upon any man or body of men."[33]

The Jury System on Trial: Its Functions, Qualifications, and Selection

Historically, the Greeks are believed to have started the first "jury-type" system of justice five or six centuries before the birth of Christ. Various public officials in Athens are recorded to have called together groups of citizens for the purpose of answering questions. Centuries later, the jury concept was adopted in Italy, France, and other parts of Europe. But the United States traces the origin of its jury to England's system, developed some 800 years ago, in which a body of men assisted the ruler in administering justice by confirming certain facts.

In the early days of American justice, juries were considered appropriate partially because of their firsthand knowledge and involvement in a particular case. This precept developed from the belief that a person accused of a crime, or involved in a contention with a neighbor, would receive fairer treatment in the administration of justice if the facts in a case were considered and judged by an assembly of that person's peers. Thus, jurors were chosen because of their immediate knowledge of local persons and events. Today, however, that precondition is generally accepted to be completely reversed. Those with firsthand knowledge of a given case are excluded from service on the jury. Conversely, total ignorance of the facts in a case is tantamount to impartiality and is, in fact, required for jury service. As a result, the modern jury has no knowledge of its case beforehand — a fact that draws criticism from both lawyers and laypersons.

Another criticism concerns the selection process used to impanel a jury and the problem of obtaining an intelligent jury. Critics contend that it is all too common to impanel a jury composed of people who are both uninformed and uninterested in civic affairs. Because the process of selecting jurors can be lengthy and tedious, judges will generally excuse potential jurors from service if they are engaged in essential business or professional pursuits. Many argue that this practice usually results in the selection of the less-qualified rather than more-qualified jurors.

Among those who are automatically exempt from jury service are lawyers, physicians, teachers, pharmacists, and the clergy. Others who are busily employed or have key occupations that make their presence on the job vital can also avoid jury service by submitting affidavits of indispensability from their employers. Therefore, it is often said that juries are not truly representative because they are drawn primarily from the middle class in society, while the upper class is usually exempt. Even those who aren't automatically excused from jury service can still get themselves dismissed by admitting to one of several disqualifying factors. Some of these factors include: previous knowledge of or acquaintance with either party in a case, admission of partiality for or against either party, support of or opposition to certain philosophies of life involved in a case, and prejudice against capital punishment in a case where it could be imposed. For these reasons, many judicial reformists contend that it is too easy to impanel an improper jury — that is, a jury not truly representative of all levels of society.

In fact, it has proven so difficult at times to impanel a jury that it has sometimes become necessary to "grab" people off the street in search of a trial panel. For example, in Odd Cases of the American Legal System, author and legal historian Johnathan Q. Fach reports an instance in which a court clerk actually obtained a juryman from a public laundromat located next to the court building.

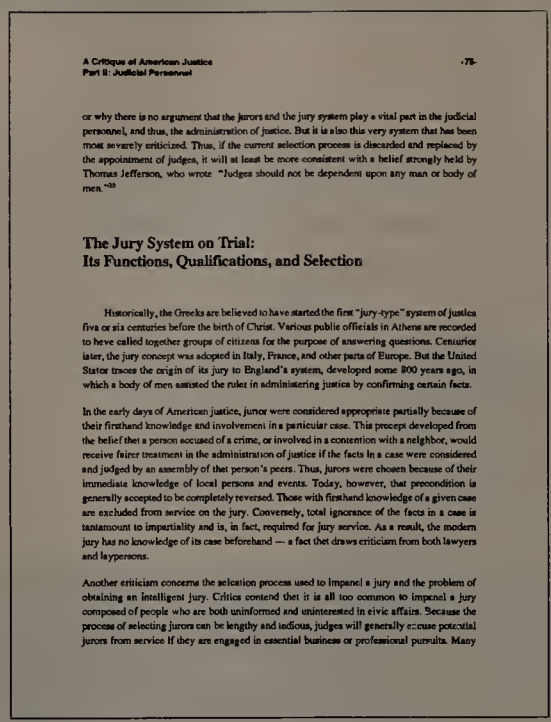

A Critique of American Justice
Part II: Judicial Personnel -75-

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**FIGURE 1: A little white space goes a long way toward making pages easier to read. To relieve the wall-to-wall text in the page on the left, the designer split the header and subhead into two lines each, adding space above and below, and increased the subhead's point size. The margin width was increased, and an extra 2 points of leading were added to the body text.**

such as spicing up drab bar charts, using clip art effectively, and managing a successful slide show. This month's column starts off by showing how to use white space to make your documents more readable.

### White Space: The Final Frontier

If you think of white space as little more than the blank area on a page, your documents may suffer from the notorious gray-page syndrome. But treat white space as an active part of good design, and you can make boring pages much more appealing and easier to read. White space is even more important with long, text-heavy reports that lack graphics or other elements to break up the page.

Often, desktop publishers hesitate to use white space because of the extra paper and printing costs. But if your document is so dense with ink that nobody wants to read it, you've wasted even more money. When you place less text on each page, your document can be read faster—and the added white space can take up surprisingly little room. Here are a few techniques for lightening up gray pages.

▶ Break long titles into two or three lines. This technique is also effective with *headers* and *footers* (information on the top and bottom of a page that identifies the page's contents).

▶ Insert at least one extra line space between *subheads* and the paragraphs below and above them (subheads are minihead-lines within a body of text). Usually, you'll want more space above than below.

▶ Add subheads to lengthy documents whenever possible.

▶ Add extra *leading* (vertical spacing) between lines of text. How much you add depends on the type family, type size, and publication style. As a rule of thumb, you should add 2 to 4 points to the type size. For example, most default formats use 10-point type with 12-point leading (10/12) or 12-point type on

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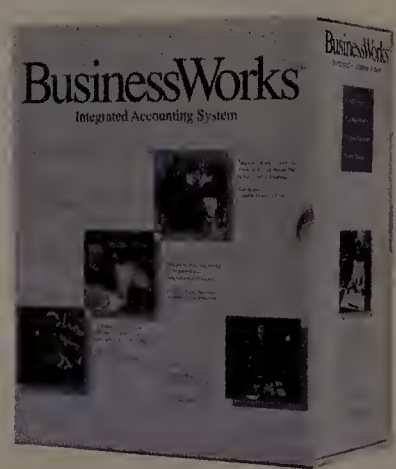


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14-point leading (12/14). To add more white space, you can stretch that to 10/14 or 12/16.

▶ Use unjustified text (text with an uneven, "ragged right" edge) to add white space to the right side of the page.

▶ Use wider margins. With some documents, you can add ⅛ inch to each margin without changing the page count. If document length is less important, you might widen the left margin to as much as 1.5 inches, as shown in **FIGURE 1**.

A wider margin is also an ideal place to put subheads, section numbers, graphics, and *pull quotes* (short text excerpts that emphasize key points in a document). In future columns, we'll explore those and other design techniques that increase the readability and impact of your documents. ●

*Contributing Editor Richard Jantz is the author of* Ventura Publisher: Beyond the Basics *(John Wiley & Sons, New York, 1990).*

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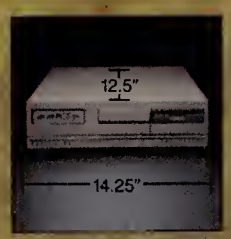

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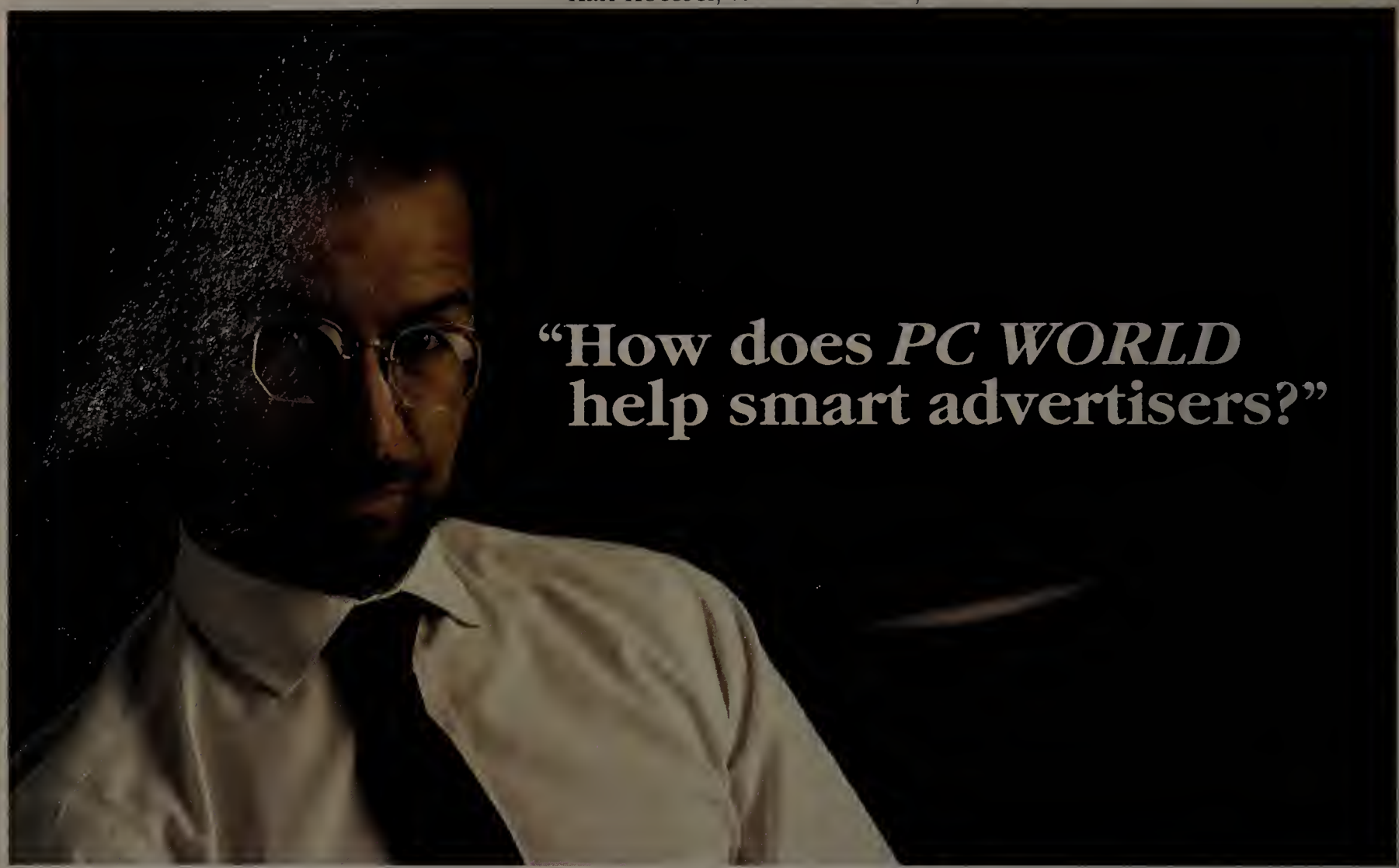
Karl Koessel, technical editor, *PC WORLD*



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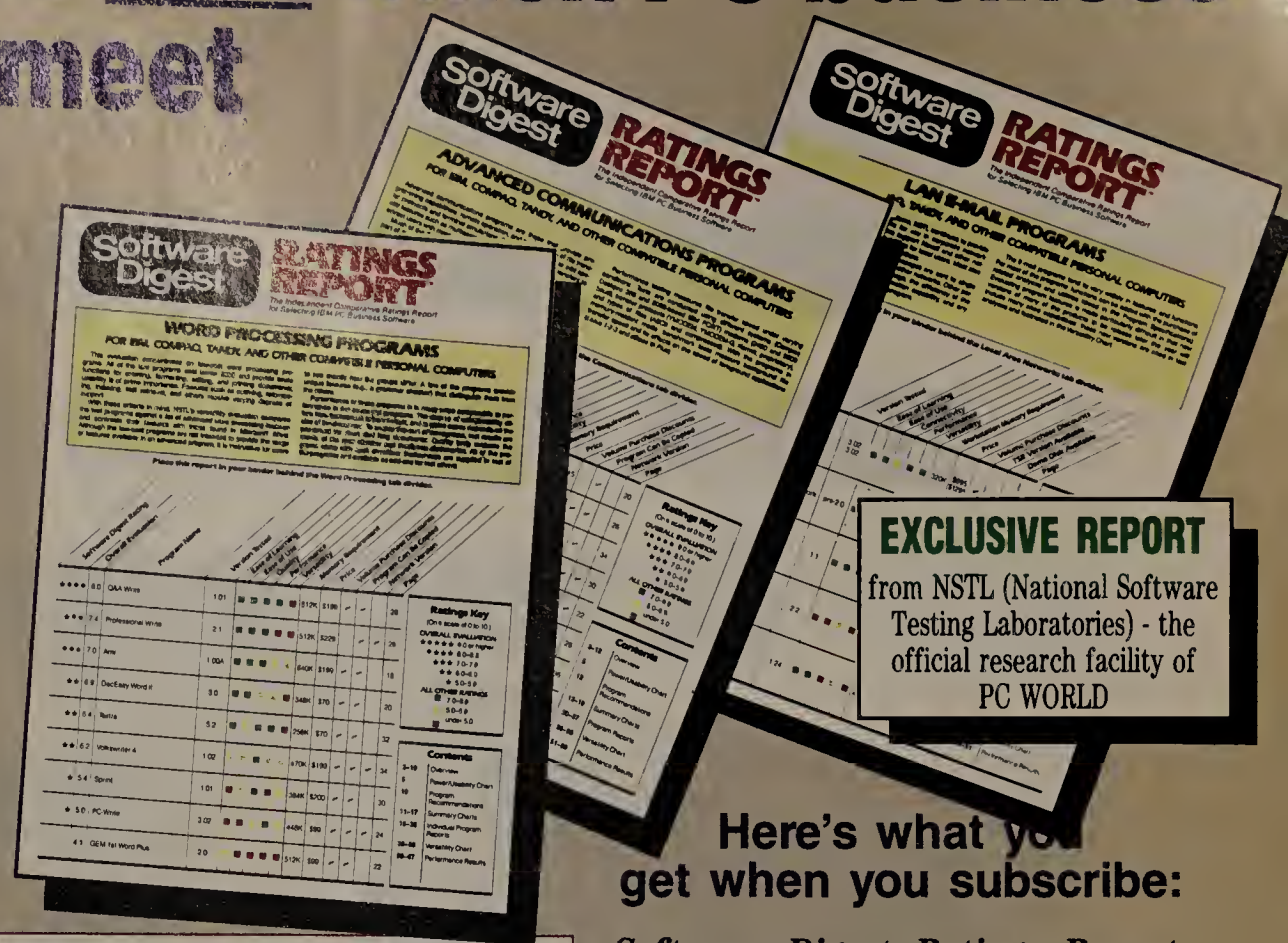


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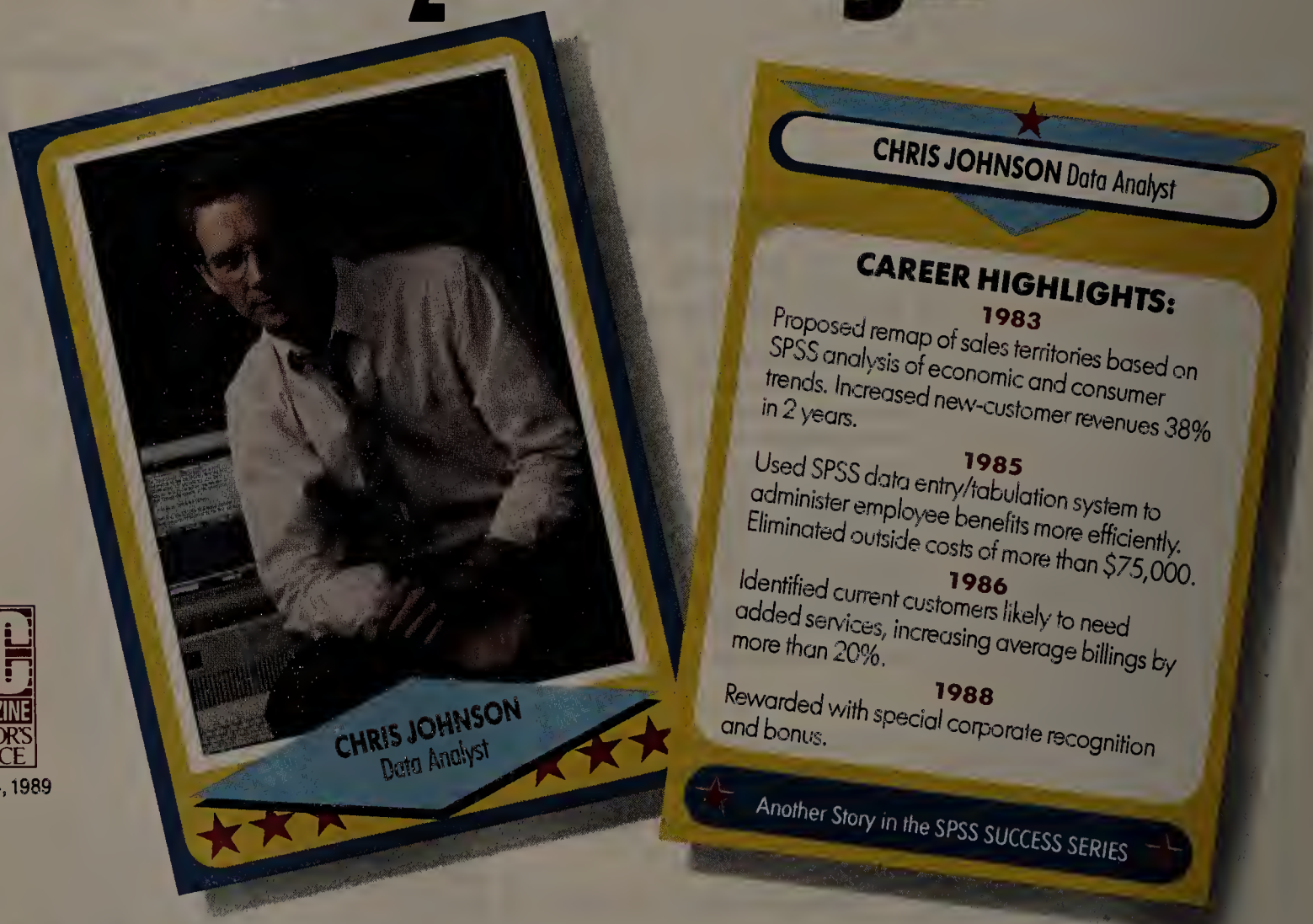


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March 14, 1989

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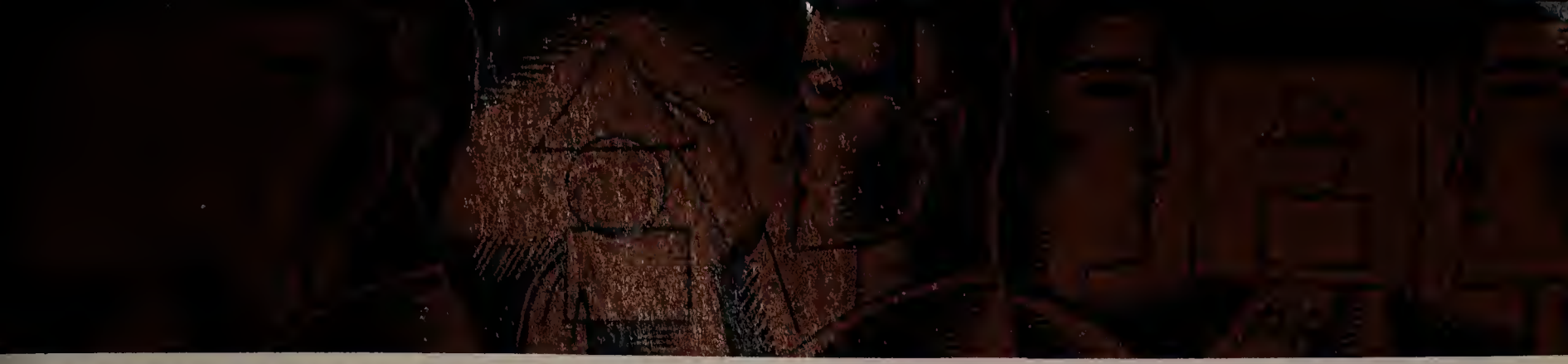
**Circle 252 on reader service card**



# STAR-DOT-STAR *.*

**A global exchange of personal computer discoveries**

Use a Pascal program to check for free disk and memory space, automate WordPerfect envelope printing, use BASIC to time your programs, display subdirectory names, fix a broken <Scroll Lock> program, and check out Borland's new three-way tool kit.

***Edited by Tom Swan***

## Free Checking

Having grown tired of waiting for the ponderously slow CHKDSK to tell me how much free disk space and memory my PC had, I wrote a fast Pascal program, FREE.PAS [see **LISTING 1**], to display a similar report. It lists the percentage and size of

```
program free;
uses dos;
var  drive  : integer;      { Drive number }
     letter : char;         { Drive letter }
     param  : string[40];   { Command-line parameter }
     dfree  : longint;      { Free space on drive }
     dsize  : longint;      { Drive size }
     pcnt   : real;         { Percent free }

{- Add commas to numbers--ex: 1234 -> 1,234 }
function withCommas( i : longint ) : string;
var s : string[80]; c : integer;
begin
   str( i, s );
   c := length( s ) - 3;
   while c > 0 do begin
      insert( ',', s, c + 1 );
      c := c - 3;
   end; { while }
   withCommas := s;
end; { withCommas }

begin { Free }
   if paramCount = 0
      then param := fExpand( '.' )
      else param := paramStr( 1 );
   letter := upcase( param[1] );
   drive := ord( letter ) - ord( 'A' ) + 1;
   dfree := diskFree( drive );
   dsize := diskSize( drive );
   pcnt := ( 1.0 - dfree / dsize ) * 100;
   write( 'Drive ', letter, ': is ' );
   if dfree >= 0 then begin
      if dfree = dsize then
         writeln( 'empty' )
      else begin
         writeln( pcnt:1:2, '% filled' );
         writeln( withCommas( dfree ):10,
            ' bytes free' );
         writeln( withCommas( dsize - dfree ):10,
            ' bytes used' );
      end;
      writeln( withCommas( dsize ):10, ' bytes total' );
   end else
      writeln( 'unavailable' );
   writeln( withCommas(
    ( memW[prefixSeg:2] - prefixSeg ) * longint(16)):10,
    ' bytes free in memory' );
end.
```

**LISTING 1: FREE.PAS displays the amount of available space on a drive and in memory.**

ANTHONY RUSSO

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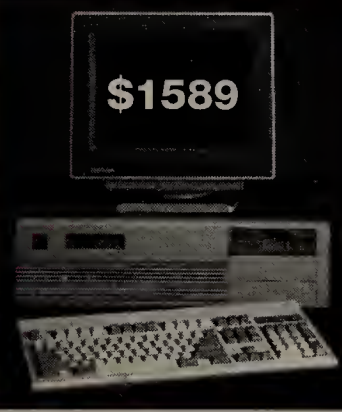
- Tower Model Available (monitor & card not included)

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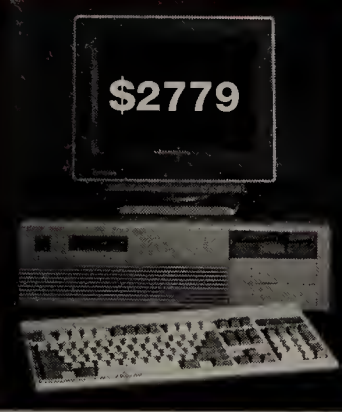


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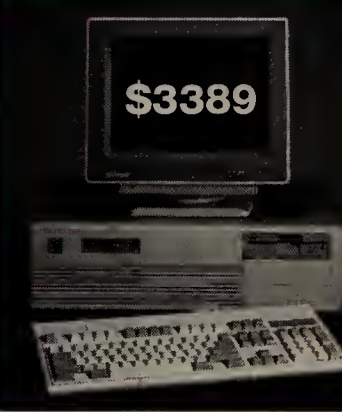


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ECH TIP/TECH TIP/TECH TIP
IP TECH TIP/TECH TIP/TECH

*Remember:*

For both hard drives and floppy drives. When using a twisted (daisy chain) main cable set all drives to drive select position two (ds2), otherwise set the drive selects to their respective positions (i.e. ds1 for the first drive, ds2 for the second drive).

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| | |
|---|---|
| <Ctrl>-<F10> | Turn on macro recorder |
| <Alt>-E | Name the macro's activation keys |
| Envelope<Enter> | Describe the macro |
| <Home><Home><Cursor Up> | Move cursor to top of document |
| <F2>Dear<F2><Cursor Up> | Find 'Dear' and move up one line |
| <Alt>-<F4> | Turn on block mode |
| <Shift>-<F2> | Search backward |
| <Enter><Enter><F2> | Locate start of address |
| <Ctrl>-<F4>12 | Copy the highlighted block |
| <Shift>-<F3> | Switch to Doc 2 |
| <Shift>-<F8>174<Enter> | Set left margin to 4 inches |
| <Enter><Enter> | Return to Format menu |
| 21855 | Center envelope; set print format |
| <Enter><Enter><Enter> | Return to Doc 2; retrieve address |
| <Shift>-<F7>1 | Print address |
| <F7>NY | Exit Doc 2 without saving |
| <Ctrl>-<F10> | Turn off macro recorder |

**FIGURE 1: Enter these WordPerfect 5.0 keystrokes to create an envelope-printing macro.**

```
60 OPEN "\timer.dat" FOR INPUT AS #1
70 IF EOF(1) THEN CLOSE: GOTO 300
80 INPUT #1,STIME$
90 STIME$= RIGHT$(STIME$,11)
100 INPUT #1,ETIME$
110 ETIME$= RIGHT$(ETIME$,11)
120 HRS = VAL(MID$(STIME$,1,2))
130 MIN = VAL(MID$(STIME$,4,2))
140 SEC = VAL(MID$(STIME$,7,2))
150 HUN = VAL(MID$(STIME$,10,2))
160 MINS = MIN + (HRS * 60)
170 SECS = SEC + (HUN / 100)
180 EHRS = VAL(MID$(ETIME$,1,2))
190 EMIN = VAL(MID$(ETIME$,4,2))
200 ESEC = VAL(MID$(ETIME$,7,2))
210 EHUN = VAL(MID$(ETIME$,10,2))
220 EMINS = EMIN + (EHRS * 60)
230 ESECS = ESEC + (EHUN / 100)
240 MINS=EMINS-MINS
250 SECS=ESECS-SECS
260 IF SECS < 0 THEN MINS=MINS-1: SECS= SECS+60
270 IF MINS < 0 THEN MINS=MINS+720
280 PRINT "Elapsed time ="MINS "min" SECS "sec"
290 SYSTEM
300 PRINT "Error in TIMER.BAT"
310 SYSTEM
320 END
```

**LISTING 2: ELAPSED.BAS measures elapsed time for TIMER.BAT.**

used and total disk space, the number of free bytes left for storing files, and the amount of available memory.

*David Manuel*
*New Westminster, British Columbia, Canada*

*Editor's note: Compile FREE-.PAS to disk using* QuickPascal *or* Turbo Pascal 5.*x, then copy FREE.EXE to a directory listed in your PATH command. At the DOS command line, type* **free** *for a report of free disk and memory space. To check a different drive, add a drive letter, as in* **free a:**.

*Because CHKDSK tests a disk's integrity and can recover lost clusters (groups of disk sectors holding data but not linked to any file), it runs more slowly than FREE, which doesn't perform these extra duties. Also, when reporting 'bytes used', FREE includes space occupied by directory information, user files, and any lost clusters—items that CHKDSK reports separately; therefore, the two programs may not produce identical reports in all cases.*

## Updating the Perfect Envelope

Among the utilities on the PowerBase *.* disk that I received when I subscribed to *PC World* was a *WordPerfect 4.2* macro for printing envelopes. Because I use *WordPerfect 5.0*, I needed to update that macro before it would work for me.

To re-create my version, retrieve or enter a letter into Doc 1 and insert two hard carriage returns before and after the address, which can have any number of lines. The salutation must contain the word *Dear*. Next, create the macro by entering the keystrokes listed in **FIGURE 1**. To run the macro, press **<Alt>-E** while you have a letter on screen and an envelope in the printer. The macro has worked flawlessly for me—I hope it will help other *WordPerfect* users.

*Rolfe R. Shellenberger*
*Palm Desert, California*

*Editor's note: If you receive the message 'ALTE.WPM is Already*

*(continues)*

## DEVELOPER'S TOOLBOX

### Three Tools Are Better Than One

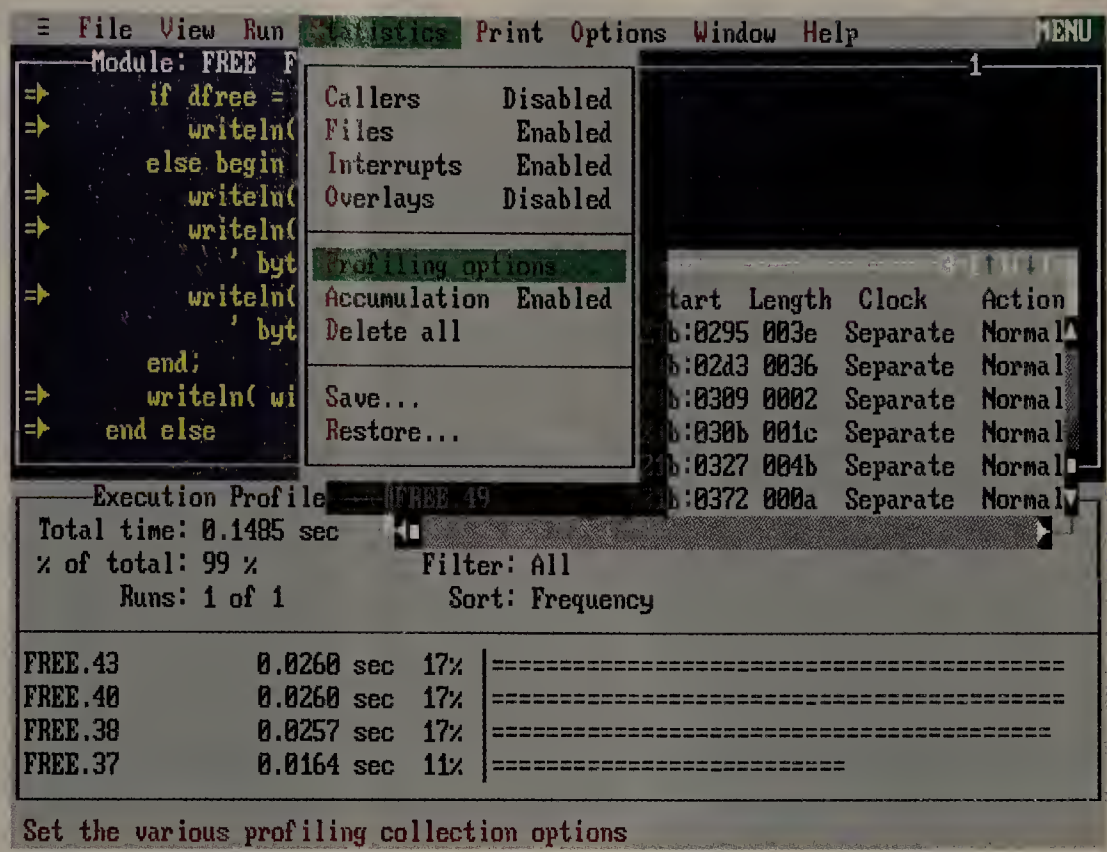
Is it true that all good things come in threes? Soon you con decide for yourself, when Borlond releoses *Turbo Debugger & Tools 2.0*. From the looks of on advonce copy, this troiko of debugging, onolyzing, ond optimizing occessories will be the unequoled productivity tool kit of the nineties.

The packoge's moinstay is o remodeled *Turbo Debugger*, which now supports a mouse. Finolly I con set program options ond bring up, resize, and move *TD* windows simply by pointing, clicking, ond dragging. I con olso click on source-code lines to set breokpoints to halt o progrom so I con exomine voriobles. I con still run *TD* from the keyboord, but using o mouse olmost mokes debugging fun!

On second thought, debugging is never fun—but it is less poinful with *TD*'s new Tracebock copobility, which con run code in reverse. Trocebock hos o few limitations—for exomple, you con't step bock through an interrupt call. Unlike *TD*'s mocro recorder, the new keystroke-recorder option con save oll keystrokes ond mouse-click positions in o disk file. This lets you record debugging octivity up to o perilous bug, then reploy the action to just before Pouline tostes locomotive greose, so you con rescue your program in the nick of time and trock down the villoinous bug.

Other new features include resident, symbol-looding, ond table-relocating commands thot focilitote debugging TSRs and device drivers. In oddition to the 80386 protected-mode support of earlier versions, *TD* now utilizes on 80286 system's extended memory.

The most intriguing tool is the new *Turbo Profiler 1.0*, o performonce onolyzer thot Borlond is billing as the world's first interactive profiler. *TPROF*, which hos *TD*'s look, feel, ond mouse support, lets you monitor oreos (modules, loops, ond stotements, for exomple) to locate code that performs most of o progrom's grunt work. Identifying thot code and optimizing it with ossembly longuoge or improved olgorithms lets you boost performonce with o minimum of effort. *TPROF* con't optimize code for you, but it con show you where reprogromming will do the most good.




Turbo Profiler 1.0 analyzes code to pinpoint where reprogramming will do the most good.

Both *TD* ond *TPROF* con hondle output from *Turbo C 2.0*, *Turbo Poscol 5.x*, ond *Turbo Assembler* (oll versions). An included utility progrom con convert Microsoft CodeView debugging information to *TD* formot, so you con olso use *TD* to debug Microsoft-languoge progroms. You can even debug code from ony compilers thot create a MAP file of public symbols ond line numbers.

*Turbo Assembler 2.0* hos also undergone a mojor spit and polish. Now on "n-poss" ossembler, *TASM* can streomline jump instructions by stripping out NOP (no operotion) ploceholders inserted during previous posses. The *MASM*-compotible *TASM* now supports 80486 instructions ond features improved high-level–longuoge interfocing.

With its three powerful progroms, *Turbo Debugger & Tools* roises the ort of softwore development to new heights. Don't hesitote to buy these tools!

I welcome your comments. My MCI Moil hondle is TSWAN; my CompuServe ID is 73627,3241. —*Tom Swon*

#### WHERE TO BUY

**Turbo Debugger & Tools 2.0**
Borland Int'l, Inc.
1800 Green Hills Rd.
Scotts Valley, CA 95066-0001
800/331-0877 (sales),
408/438-8400 (customer service)
LIST PRICE: $149.95, with Turbo Pascal Professional $250
REQUIREMENTS: 384K (256K for Turbo Assembler), DOS 2.0 or later version
TECHNICAL SUPPORT: unlimited, toll number, M–F 8–5
OTHER SUPPORT: CompuServe forum (GO BOR)
**Reader service no. 635**

# There's gold

# Now, Quarterdeck's new

Memory is gold.

And like gold, some of it is hidden away inside your computer. For years, we've been working toward putting it all under your control. And now we can.

Now you can make today's more powerful programs run without giving up network and mouse drivers and TSRs.

## Introducing Manifest—the Quarterdeck memory analyzer

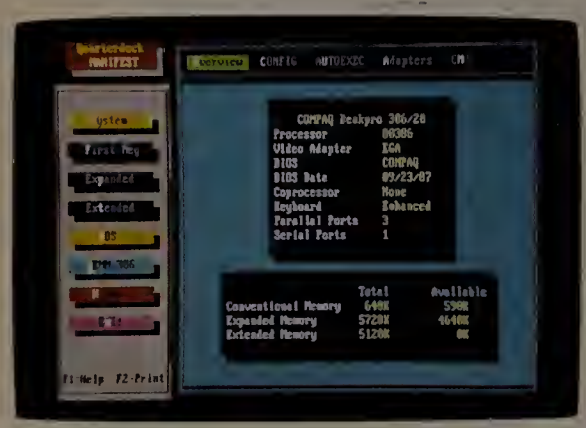
Many PC users know there are nuggets of memory sitting unused in most PCs. But those little pieces of memory can add up to 130K!

That's why Quarterdeck Office Systems, publisher of DESQview, developed a new utility that helps you find and use this memory. It's called Manifest. And it does for memory what PC Tools does for disks. For under $60.

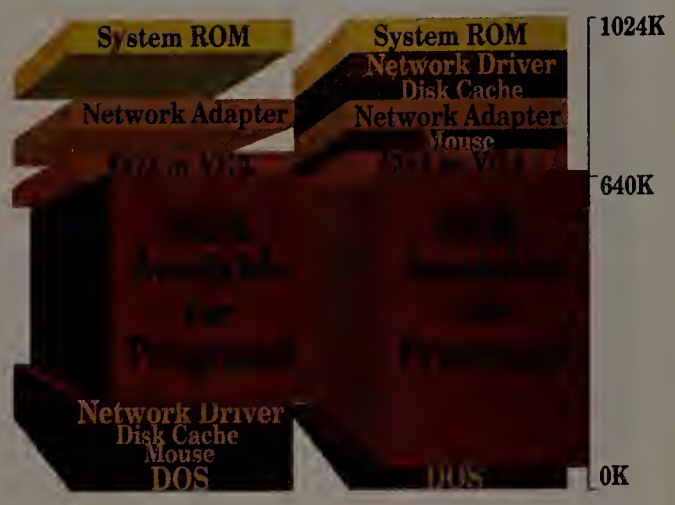
## Quarterdeck's seven years of memory expertise made Manifest

Manifest guides you deep inside your PC.

It locates unused (or underused) memory and suggests where you could load networks, buffers, mouse drivers, TSRs and other utilities to increase performance. It even analyzes what type and amount of RAM you have available, and which portions of your memory are faster.




Manifest shows you how your memory works. Here's the first megabyte of RAM, showing unused areas.




Your current memory is full of holes. Our tools can fill blocks of unused addresses between 640K and 1024K to free up memory your programs can use.

Manifest shows you the contents of AUTOEXEC.BAT and CONFIG.SYS files. That can be a big help when diagnosing problems. Manifest tells you all about your hardware, too —from your cpu type to what boards you have installed. Manifest even tests memory speed. And it runs benchmark tests on expanded memory boards so you can make informed buying decisions.

Administering a number of PCs? Manifest's diagnostic and reporting capabilities reduce technical support time. It not only identifies problems but helps to solve them.

You won't need a PhD to understand what you're doing. Manifest has an interactive 'manual' that tells you how to use the program and what benefits you'll get.

And unlike a lot of hot new software, Manifest works on virtually any PC: 8088, 8086, 80286 or 80386. It's a productivity breakthrough from the memory experts at Quarterdeck.

INFO WORLD
BEST IN ITS CLASS
Dec. 18, 1989

## Introducing QRAM—the Quarterdeck memory optimizer

End RAM cram in your 8088, 8086 or 80286 PC once and for all. QRAM (pronounced cram), is a package of utilities that gives you unprecedented control over memory, letting you set up your memory the way it will work best for you.

If you have EMS 4.0 or EEMS boards, QRAM can find unused addresses and 'map' memory to those addresses. Then it looks at your AUTOEXEC.BAT and CONFIG.SYS files and figures out what TSRs, network and mouse drivers and DOS resources can be loaded high and where.

And, like all Quarterdeck memory products, QRAM is compatible with the Microsoft XMS specification used by Windows 286, V. 2.x.

If your PC has 'shadow RAM,' there's even

QRAM optimizes your memory performance by moving utilities and drivers out of the area between 0K and 640K — freeing it up for your programs to use.

more gold in your PC. QRAM finds the unused parts and puts them under your control.

And if you have an EGA or VGA-equipped PC and don't need graphics at the moment, QRAM will make an additional 96K 'nugget' of memory available! When you need graphics again, QRAM will switch you back to graphics mode! Think how helpful that will be for those big dBASE files.

It can't work miracles, but if there's memory available anywhere, QRAM lets you use it to increase your PCs speed and performance.

QRAM is available bundled with Manifest for just a few dollars more than Manifest alone.

Manifest and QRAM—two more examples of Quarterdeck's commitment to mining the most productivity out of the PC and software you own today.

Special Offer!

DESQ view™
Quarterdeck

# There's Gold in Your PC!

## And Here're the Map & Tools to Find It.

# Memory's

When your PC programs were few and small in size, you didn't have to think about memory as a precious resource to be rationed and used smartly. Today memory is just that! Pure Gold!

Today, each new program update brings a larger, more featured program. PC networks require software, resident in your PC, that communicates to the network. Easy-to-use, point and click, program interfaces require memory-resident mouse software. Terminate and stay resident (TSR) software, such as Sidekick, work best when they are on hand instantly.

What this means to PC users is that the 640K of memory used to run DOS programs is crammed full. So there's much to be gained when you can use this memory more efficiently.

But, memory is important for another reason. It's memory (***and the right kind of memory***) that enables DOS to be transformed into a next generation operating system. With the right kind of memory, you can run large (32MB or larger) programs. You can run several programs simultaneously (multitask). And you can give your programs the space they need to communicate and work together (sharing data and starting new tasks).

DESQ™ view
Quarterdeck

# Precious.

Those who understand how to get the most power out of a PC's memory have a significant advantage over those who don't. We know this--for Quarterdeck has been a leader in using memory to give DOS the power of OS/2.

1986--Quarterdeck's DESQview broke through the DOS 640 barrier--using expanded memory to multitask programs on 8088 and 80286 PCs.

1986--DESQview became an 80386 control program, providing multitasking for DOS using the 80386's extended memory.

1987--the Quarterdeck Expanded Memory Manager-386 (QEMM-386) transformed the 80386's extended memory into expanded memory.

1987--the Quarterdeck Expanded Memory Manager-50/60 (QEMM-50/60) transformed IBM's 80286 PS/2 Memory Expansion Option & Expanded Memory Adapter/A into expanded memory.

1987--in conjunction with Phar Lap Software specified the Virtual Control Program Interface (VCPI), which ensured compatibility among DOS extended programs (such as Paradox 386, 1-2-3 Release 3), expanded memory managers, and control programs.

# Introducing
## Your Treasure

Manifest is the map that can lead you to whatever gold is in your PC. It gives you an instant snapshot of your PC. And it tells you everything about your PC's memory.

This includes an inventory listing of the hardware in your PC, details about your version of DOS, as well as a picture of the contents of your CONFIG.SYS and AUTOEXEC.BAT files. Manifest includes details on whatever memory you have (first megabyte, expanded, or extended) and *even gives you hints on how you can better use it.*

There's lots you can do with Manifest. But for sure, keep Manifest on hand when you're calling for support on a program or on your PC.

For the user new to a PC, Manifest is an introductory course, not only in memory, but in all the key components of a computer system-with the advantage that the information provided is about your own PC.

When you run Manifest, you'll instantly learn whether your PC has the math coprocessor needed by AutoCAD, or the expanded memory recommended by 1-2-3 Release 2.

If you're a power user, Manifest shows you the memory your PC hardware is addressing, and how interrupts are being used by both

DESQ view™
Quarterdeck

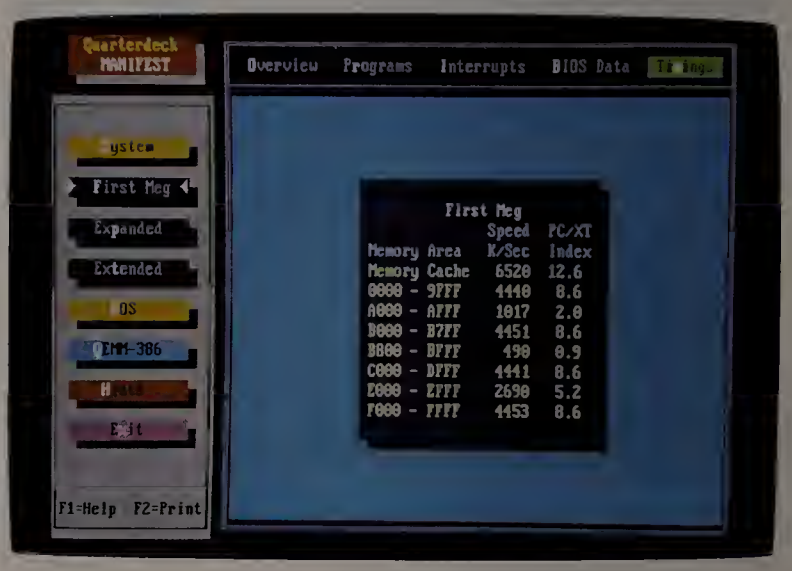
# Manifest
## Map to the Gold.

hardware and software. And because Manifest can be run as a TSR, it becomes a debugging tool.

For the person responsible for supporting PCs in a company, Manifest gives an instant inventory of a PC--especially about memory and each device or program using this memory. Manifest gives you detailed information about the processor type (8088, 8086, 80286, 80386), DOS version, BIOS manufacturer and date, video adapters, serial and parallel ports, microchannel adapters, and much more--*all without opening the case.* This information can be printed or saved to a file on disk instantly. A real time savings!

You can use Manifest to display your CONFIG.SYS and AUTOEXEC.BAT files– very convenient when describing your PC.

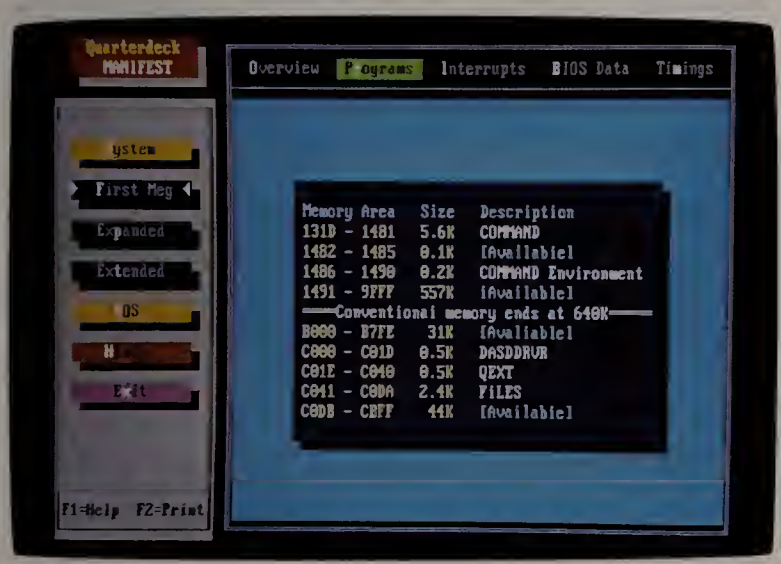
Take Manifest along with you to the store. Manifest tells you what's under the hood of a PC. It even times your PC's memory and runs benchmark tests on expanded memory.



DESQ™ view

Quarterdeck

Manifest shows you whether you can use the memory from 640K to 1MB to run TSRs, network drivers, and DOS resources. It gives you maps of the first megabyte and information about the size and memory location of your TSRs. And it even makes recommendations on how to optimize the memory used on your system!



# Strike it Rich on

It's often not easy to assess how much gold is in any claim, but we've a product called QRAM (pronounced cram) to help. QRAM is a set of memory tools for 8088, 8086 and 80286 PCs that assist you in getting the maximum use of your PC's memory. QRAM can't work magic–but if you have memory capable of running programs but not currently being used, QRAM makes it available. To that end, QRAM manages your PC's high memory, EGA/VGA video memory, and extended memory.

High memory (the memory addresses between 640K & 1024K) has been traditionally reserved by IBM for use by PC hardware. As DOS programs have become larger, and as TSRs and networks have become more popular, high memory has increased in importance. The reason–there are often more memory addresses reserved for system hardware than are actually being used. So there are precious available memory addresses, waiting to be used!

If you have expanded memory hardware (compatible with either EMS 4 or EEMS expanded memory specifications), QRAM uses the expanded memory's mapping capabilities to fill unused memory addresses in your PC's high memory. Using QRAM, you can then load TSR's, device drivers (such as networks), and DOS resources (i.e. FILES or BUFFERS) in this memory.

# an 8088 or 80286.

Depending on your PC, QRAM makes anywhere from 30-130K of high memory usable.

Note that QRAM can also load TSR's, drivers and DOS resources high if your PC has shadow RAM.

You don't have to be a PC guru to use high memory. QRAM, in conjunction with your expanded memory manager, automatically maps expanded memory into available addresses. Then QRAM's optimize feature examines your CONFIG.SYS & AUTOEXEC.BAT files to determine what can be loaded high, and makes any changes necessary.

For those of you who need memory *more than* EGA or VGA graphics, QRAM makes the 96K reserved for your EGA or VGA adapter available to DOS programs. The caveat is that while you are using this memory, you can't be doing graphics. But, QRAM makes it easy for you to turn on and off this feature.

That's not all! QRAM is also an extended memory manager, compatible with the XMS extended memory specification, specified by Microsoft and used in Windows 286 v2.

The end result is that however you need to use memory, QRAM will do its best to make your memory into what you need.

# A Gold Vein in

If you have an IBM PS/2 Model 50 or 60 with either an IBM 80286 Memory Expansion Option, an IBM Memory Expanded Memory Adapter/A, or compatible, there's a gold vein in those boards, ready to be mined.

Although you might not know it, built into these boards is the hardware necessary for expanded memory. You need only a special software driver to access that hardware! And that's what the Quarterdeck Expanded Memory Manager (QEMM-50/60) does. We have a new version, Version 5, which, in addition, takes advantage of high memory, EGA/VGA video memory, and extended memory.

QEMM-50/60 transforms any of the above boards into expanded memory, compatible with all three expanded memory specifications (EMS 3.2, EMS 4.0, EEMS). So there's no need to buy a special expanded memory board for a PS/2 Model 50 or 60. No worry. Just run your programs designed to take advantage of expanded memory (like 1-2-3 Release 2, Framework, Paradox 3).

QEMM-50/60, like QRAM, enables you to load TSR's, device drivers (such as networks), and DOS resources (i.e. FILES or BUFFERS) in high memory. And to assist you in determining what can be loaded high and where, QEMM-50/60 comes with its own microchannel adapter library.

# PS/2 50's and 60's.

Even the novice PC user can set up QEMM-50/60 to get the best use of memory. For QEMM installs itself (and if you wish) has an optimize feature which can load your TSRs, network drivers and DOS resources in high memory–automatically.

For those of you who need memory more than EGA or VGA graphics, QEMM-50/60 makes the 96K reserved for your EGA or VGA adapter available to your DOS program. The caveat is that while you are using this memory, you can't be doing graphics. But, QEMM-50/60 makes it easy for you to turn this feature on and off.

QEMM-50/60 is also an extended memory manager, compatible with the XMS extended memory specification, specified by Microsoft and used by Windows 286 v2.

If you use QEMM-50/60 with DESQview, DESQview can run (multitask) programs in expanded memory. However, in order to effectively use any DOS multitasking environment on a PS/2 Model 50 or 60 (DESQview, Microsoft Windows 2.0, or IBM 3270 Workstation Program), the PS/2's motherboard memory must be disabled. You do need, then, at least 1.5 megabytes of memory on your IBM 80286 Memory Expansion Option before multitasking is effective.

# QEMM-386: A Bon

You reap a memory bonanza with the Quarterdeck Expanded Memory Manager-386 (QEMM-386) Version 5. It's an expanded memory manager for 386 PCs and PS/2s. *And more.* For QEMM-386 gives you maximum flexibility in memory usage.. Like QRAM and QEMM-50/60, QEMM-386 lets you load TSR's, device drivers and DOS resources in high memory, manages EGA/VGA memory and acts as an extended memory manager.

In addition, QEMM-386 is also an 80386 control program. This enables QEMM-386 not only to take advantage of the 80386 processor to help you find more available high memory, but also to make 80386 power available to Quarterdeck's DESQview for multitasking, screen virtualization, and program protection.

QEMM-386 is compatible with all the current industry memory specification standards. EMS 3.2, EMS 4, and EEMS expanded memory specifications. The XMS specification for extended memory. And the Quarterdeck/Phar Lap virtual control program (VCPI) interface, (incorporated in 1-2-3 Release 3, IBM Interleaf, Paradox 386, and other powerful programs), for running protected mode programs in DOS.

It is QEMM-386's expanded memory capabilities that enables it to load TSR's,

# anza (Unto Itself).

drivers, and DOS resources in high memory. In order to give you as much high memory as it can, QEMM-386 finds and maps memory addresses as small as 4K (rather than the 16K mapped by EMS managers).

Additionally, if your PC is either a Compaq configured with top memory or if it has Chips & Technologies shadow RAM, QEMM-386 detects this memory and makes the best use it can out of it. For PS/2s and others using microchannel architecture, QEMM-386 includes an "Adapter Description Library" (ADL). QEMM-386 uses this information to insure a maximum amount of safely accessible high memory with PS/2 s.

For users new to 386 PCs, QEMM-386 sets up your memory as optimally as it can--***automatically.*** And it has an optimize feature which can load your programs high--so there's no need to be a memory guru.

But, for memory addicts, QEMM-386 has two other features. The first, called Accessed, watches high memory and notes what has been accessed by your programs. The second, called Analyze, uses the information from Accessed to tell you what memory addresses you may additionally use to load TSRs, drivers, etc. The goal, of course, always, is to give you the maximum utilization of your most precious PC resource, memory.

## DESQview & DESQview 386
## Not to Be Ignored.

The future of personal computing is clear. Easier to use PCs. More powerful PCs with graphics and text programs working side by side. Talking to each other. Multitasking. Windowing. Transferring data. Menuing. Mousing.

With DESQview you get the next generation computing capabilities now on your 8088, 8086, 80286, or 80386 PC or PS/2. And you get these powerful capabilities without obsoleting your investment in DOS, your programs, or your time spent in learning and using these programs.

For DESQview today multitasks within 640K and beyond. It does windows. It transfers data. It dials your phone. It gives you menus for DOS. It remembers your keystrokes (macros). And more.

When DESQview is combined with QEMM-386, it becomes an 80386 control program, taking advantage of its virtual 8086 machine architecture and its 32-bit protected mode. We call this combination, DESQview 386.

By controlling these 80386 features, DESQview 386 gives you program protection plus the ability to run large memory intensive 80386-specific programs side by side with your standard DOS programs. Moreover, DESQview 386 lets you run text or graphics (CGA, EGA, VGA, or Hercules) programs in small windows and in background.

NOTE: The 80386 processor's most powerful mode is its 32-bit protected mode. So that 32-bit 386 programs can run on DOS, a special program, called a DOS extender, must be part of the program. Realizing the importance of the DOS Extender, Quarterdeck has worked to ensure compatibility between DOS extenders (286 & 386) and DESQview. The result is the Quarterdeck Phar Lap Virtual Control Program Interface Specification (VCPI), specifying the interfaces between DOS extenders and 386 control programs.

Special Offer Expires 6/30/90

DESQ view™
Quarterdeck

# Yes! I'm interested in finding gold in my PC!

| No. | Diskette 5¼ | Diskette 3½ | Product | Price Each | Total |
|---|---|---|---|---|---|
| | | | QEMM-386 (V5.0) (includes free Manifest!) | $99.95 | |
| | | | QEMM-50/60 (V5.0) (includes free Manifest!) | $99.95 | |
| | | | QRAM (V1.0) (includes free Manifest!) | $ 79.95 | |
| | | | Manifest (V1.0) | $ 59.95 | |
| | | | DESQview 2.26 | $ 129.95 | |
| | | | DESQview 386 (V1.1) (DESQview, QEMM-386 and free Manifest!) | $ 219.90 | |
| | | | Shipping & Handling<br>USA<br>Outside USA | <br>$ 5.00<br>$ 10.00 | |
| | | | Sales Tax (CA residents) | 6.5% | |
| | | | Amount Enclosed | $ | |

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150 Pico Boulevard, Santa Monica, CA 90405
(213) 392-9851
Fax (213) 399-3802

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DESQ™ view

Quarterdeck

Quarterdeck Office Systems
150 Pico Boulevard Santa Monica, CA 90405

# in your PC.
# tools can mine it for you.

## Introducing QEMM 50/60 Version5.0

QEMM (Quarterdeck Expanded Memory Manager) 50/60 is the gold standard in memory management for the IBM PS/2™ series 50 and 60. It works with IBM's Memory Expansion Option, Expanded Memory Adapter/A and compatible memory boards.

It supports all three specifications for expanded memory: EMS 4.0, EMS 3.2 and EEMS memory so you can run all expanded memory programs.

And it also works with Microsoft's XMS specification, in case you want to use Windows.

QEMM lets you use memory locations between 640K and 1024K to run TSRs, mouse and network drivers, DOS resources and MCA adaptors. That means you can gain up to 130K of memory space below 640K for your programs.

Best of all, QEMM is designed to be easy to use—even for those new to the PC. Just install it and type 'optimize,' and it looks at your AUTOEXEC.BAT and CONFIG.SYS files and loads whatever it can in high memory. Automatically.

QEMM 50/60 is priced economically. It's the biggest boost you can give your PS/2 for under $100.

QEMM and DESQview let you multitask and window with the programs you know and use today.

## Introducing QEMM 386 Version5.0

QEMM 386 can expand the memory of all 386-based computers, including PCs with 80386 upgrade boards. It makes your memory compatible with EMS 4.0, EMS 3.2 and EEMS memory without having to add special hardware. It's compatible with protected-mode programs (like 1-2-3 Release 3, IBM Interleaf and Paradox 386) using DOS extenders compatible with the Quarterdeck/Pharlap VCPI spec.

QEMM also works with Microsoft's XMS spec to extend memory for Windows users.

QEMM gives you maximum control over your memory between 640K-1024K. It can find unused memory nuggets as small as 4K and use them to free up room for programs to use.

QEMM 386 even monitors how your programs use memory while they're running. Then it shows you where there's additional memory you can use. It even measures which parts of your memory are fastest and 'decides' how to use them for better performance. In action, it's easy and fun—almost like having an *artificial intelligence* program to help tune up your PC.

All these capabilities add up to greater performance at a very low cost. And QEMM lets you go for the gold without having to become an expert on the PC memory puzzle.

Like all Quarterdeck products, it works with your current PC and favorite software.

## A few words about DESQview

What's the smartest thing to do with all that additional memory? Run DESQview and multitask your favorite programs in windows. Use a mouse or keyboard and you can run graphic and text-based programs side-by-side. All without having to invest in a bigger hard disk or more memory.

DESQview's recent awards.

From Manifest to QRAM, QEMM and DESQview, Quarterdeck helps you mine the most from the software and PC you have today.

**System Requirements**

**Manifest:** 8088, 8086, 80286 80386 and i486 PCs & PS/2s

**QRAM:** 8088, 8086, 80286 PCs. Use of high memory is only available when PC has EMS 4 or EEMS expanded memory or Chips & Technologies shadow RAM.

**QEMM 50/60:** 80286-based PS/2s and compatibles with IBM PS/2 80286 Memory Expansion Option, IBM PS/2 80286 Expanded Memory Adapter/A or compatible.

**QEMM-386:** 80386-based PCs and PS/2s and PCs with 80386 add-in boards.

Trademarks: IBM, PS/2: IBM Corporation; PC Tools: Central Point Software; 80386, i486: Intel Corporation, Chips and Technologies: Chips and Technologies

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|---|---|---|---|---|---|
| | Manifest 1.0 | | | $59.95 | |
| | QRAM and Manifest 1.0 | | | $79.95 | |
| | QEMM 50/60 5.0 (with Manifest*) | | | $99.95 | |
| | QEMM 386 5.0 (with Manifest*) | | | $99.95 | |

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California Residents add 6.5% _____

Grand Total _____

*Introductory offer extended to 6/30/90

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```
echo off
if "%1"=="" goto instruct
echo | more | time | find "C" >\timer.dat
%1 %2 %3 %4 %5 %6 %7 %8 %9
echo | more | time | find "C" >>\timer.dat
c:\dos\basica c:\basic\elapsed
del \timer.dat
goto end
:instruct
echo Use: Enter command or program to time
echo Example: timer dir *.*
:end
```

**LISTING 3: TIMER.BAT runs a program and then executes ELAPSED.BAS for an elapsed-time report.**

```
@echo off
dir | find "<DIR>" | find /v ". " | more
```

**LISTING 4: SUB.BAT lists subdirectories in the current drive.**

*Defined', press* **1** (**1Y** *in version 5.1) to replace the existing macro, or press* **0** *to start over with a letter other than E. If you press* **<Alt>-E** *to print an envelope but printing doesn't begin immediately, type* **<Shift>-<F7>4G**—WordPerfect's *print job Go command.*

*If you're using* WordPerfect 5.1, *you'll have to make one slight change: Line 14,* '<Enter><Enter><Enter>,' *requires two extra* **<Enter>***s.*

*This is just one of many* WordPerfect *envelope macros floating around. You can find another—one that requires you to place the cursor at the start of the address—in the MACRO.WPK file that comes with* 5.0 *and* 5.1.

## Passing the Time With BASIC

When choosing a command or a program, I prefer to pick the fastest one. So to help me measure the time that passes while a command executes or the time I spend in an application, I developed a BASIC program, ELAPSED.BAS [see **LISTING 2**], and a batch file, TIMER.BAT [see **LISTING 3**]. To use them, type **timer** plus a command: for example, **timer dir** or **timer quattro**.

*Gil Gagnon*
*Mississauga, Ontario, Canada*

*Editor's note: Change 'basica' in line 6 of TIMER.BAT to* **gwbasic** *if your version of DOS came with* GW BASIC. *Better yet, if you have* QuickBASIC *you can compile ELAPSED.BAS to improve performance and prevent the screen from clearing. If you compile the program, replace the sixth line of the batch file with* **elapsed** *and copy both files to a PATHed directory. The DOS utility programs MORE and FIND must also be in a PATHed directory.*

## SUB Standard

To create a standard way to list subdirectory names in a directory, I wrote SUB.BAT [see **LISTING 4**]. This batch file pipes DIR's output to the FIND filter twice —once to locate lines containing '<DIR>' and again to eliminate current (.) and parent directory (..) alias entries. The result is then piped to MORE, making a long listing pause until you press a key.

*Michele Todd*
*Dallas, Texas*

*Editor's note: FIND.EXE and MORE.EXE must be in the current directory or a directory listed in the PATH statement. And, if you're not using DOS 3.3 or a later version, change* '@echo' *to* **echo** *in the first line.*

## Correction

In "Putting <Scroll Lock> to Work" [*Star-Dot-Star*, October 1989], the lone minus sign near the end of line 1090 in **LISTING 1** should be -1.

*Glen Briggs*
*Duarte, California*

*Editor's note: There was another misprint in the listings for this tip. On line 140 of* **LISTING 2**, 'GOUB' *should have been* **GOSUB.PC**. PC World *regrets the errors.*

*Tom Swan is a contributing editor for* PC World *and the author of* Mastering Turbo Pascal 5.5 *(Howard W. Sams and Co., Indianapolis, 1989).*

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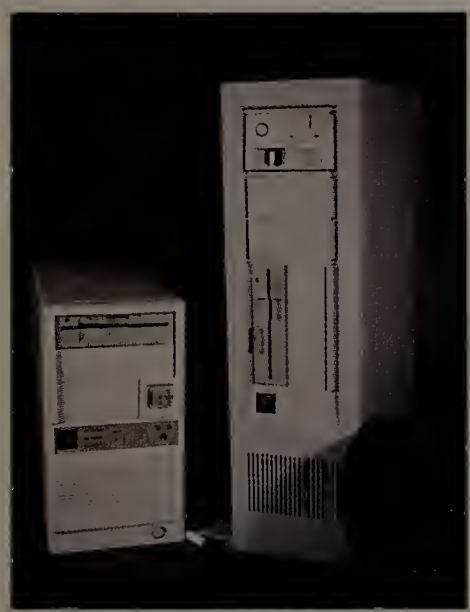

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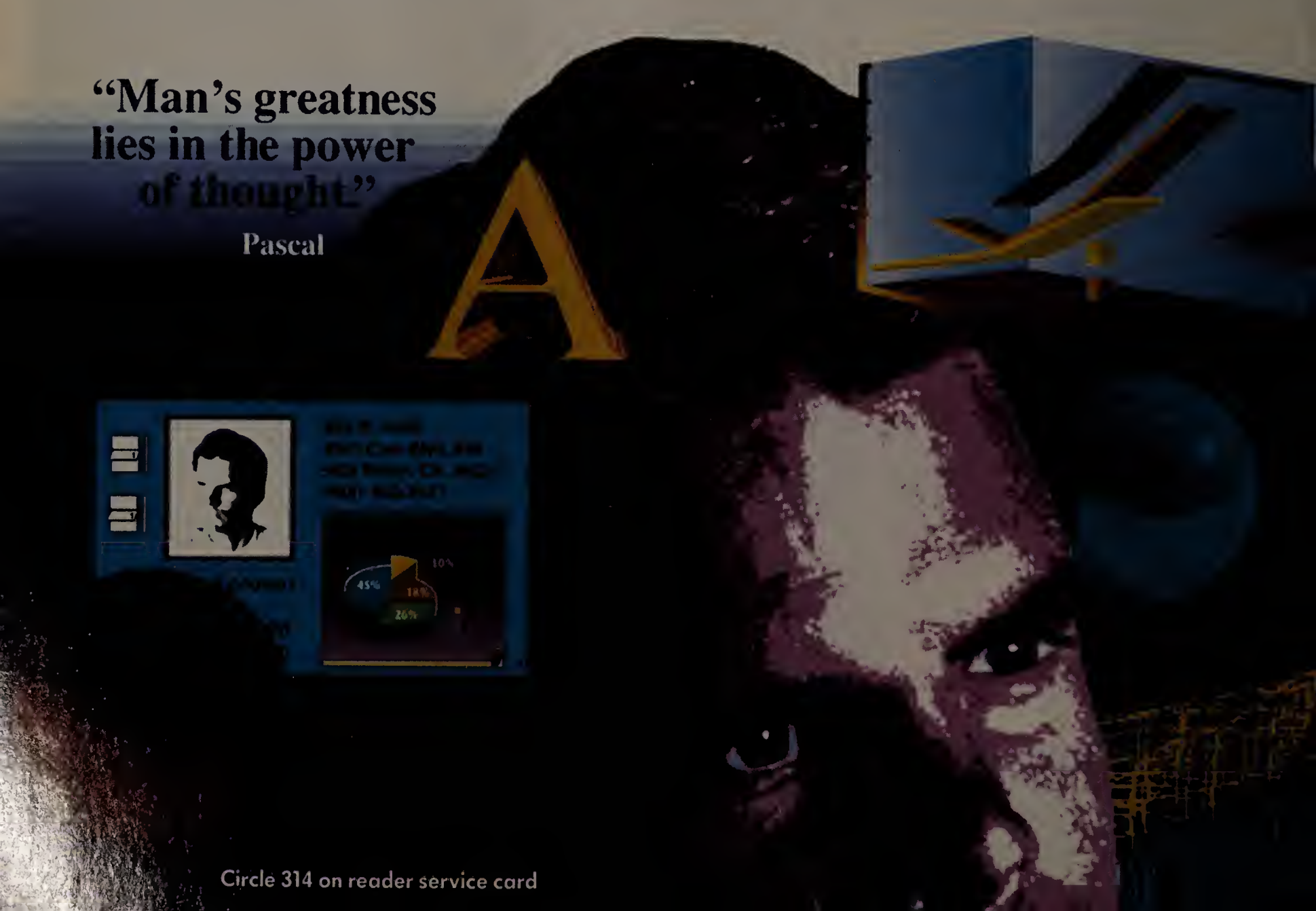


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# NETWORK Q&A

## Tips and strategies for departmental networking

Bridging the gap between a PC network and a Macintosh LAN is easier than you think.

*David Ferris*

**Q.** *Our CPA firm uses two kinds of desktop computers. The 5-person accounting staff works on PCs, and our 25 customer-service reps use Macintoshes. We'd like to connect the Macs and the PCs so the reps can enter billing information on their Macs and the processing can be done on the DOS side. How should we proceed?*

*Heinrich Rhinemuller*
*San Francisco, California*

**A.** Connecting Macs and PCs is easier than you think. But study the options before making a decision, because there are several ways to skin this cat—and some are a bit problematic.

ANTHONY RUSSO

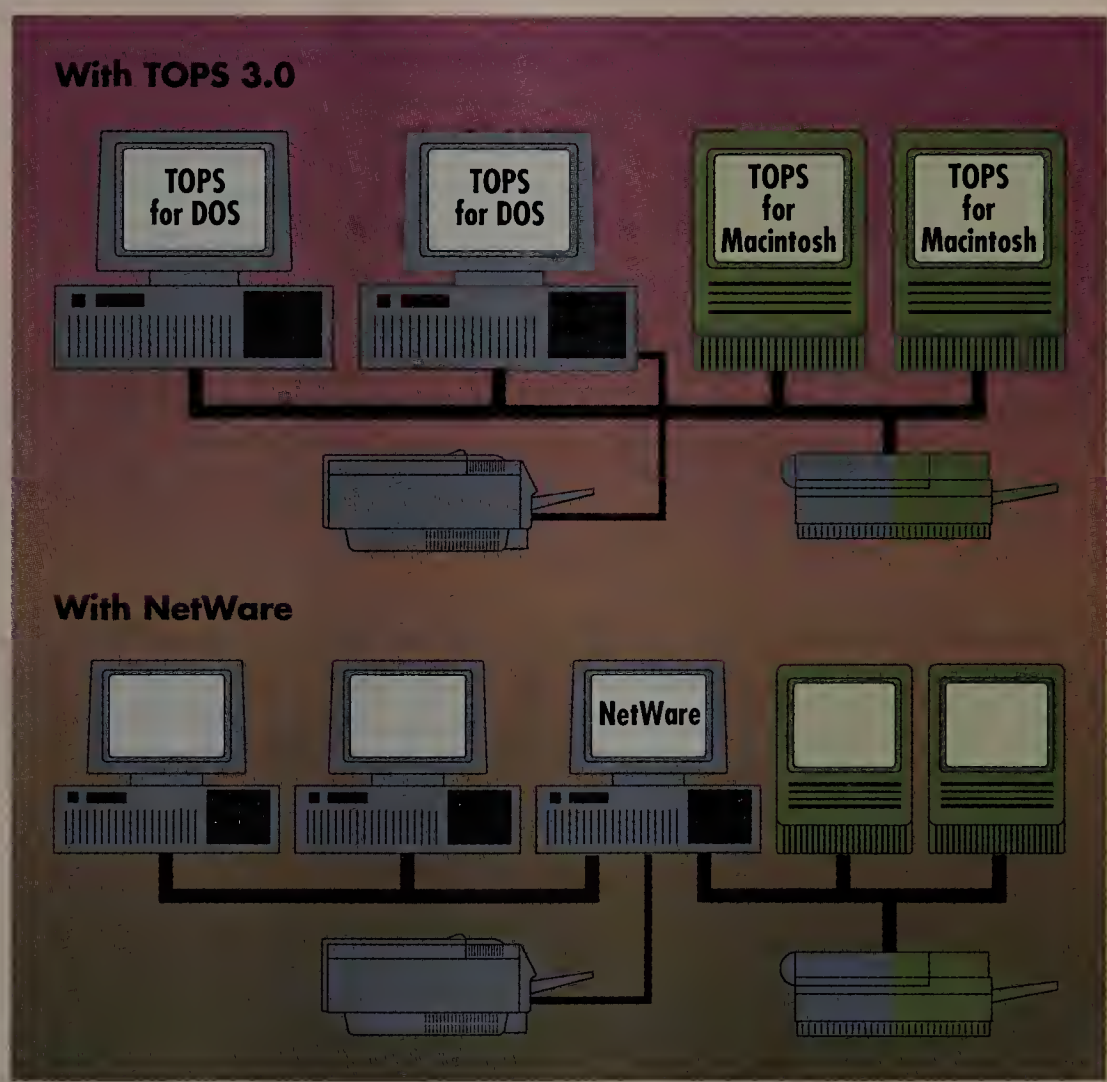
### Connection, Please

The most important reason for forging a Mac-PC LAN connection is probably electronic mail: In many networked offices, E-mail is proving to be the single most important productivity tool on the LAN. But E-mail works only if everyone is on the net, regardless of computer type.

File sharing across the Mac-PC barrier is a big plus. For example, advertising copy can be prepared on a PC using *Microsoft Word* and then sent to a designer who uses *PageMaker* on the Mac to format the text and

*(continues)*

## Connecting Macs and PCs




**In the TOPS peer-to-peer LAN (at top), all workstations are connected by LocalTalk. A separate copy of TOPS is needed on each system. Both PCs and Macs can print to the LaserWriter (attached directly to the LocalTalk cable), but only PCs can print to the PC workstation's LaserJet.**

**In the NetWare LAN (at bottom), the server is connected to PCs by Ethernet and to Macs by LocalTalk. Almost all NetWare software resides on the server: PC workstations need only a small NetWare driver, while Macs talk to the server via AppleShare (part of the Mac's operating system). Again, both PCs and Macs can print to the LaserWriter, but only PCs can print to the server's LaserJet.**

add graphics. Or, as in your case, data from a Mac can be processed on a PC.

Some network operating systems (NOS's), like TOPS 3.0, and some applications, like *Foxbase*, let Mac and PC users access the same data file at once. Unfortunately, barring the use of unwieldy coprocessor boards or slow, expensive emulation software, there's no way to run Mac applications on a PC or vice versa.

Printer sharing is another benefit of Mac-PC connectivity. With the right network software and printer utilities, PCs can send output directly to networked Apple LaserWriter printers, taking advantage of their PostScript capabilities. (Going the other way—Mac data to PC printers—is trickier.)

### Hardware and Software Strategies

As always, you'll need both hardware and software to make a Mac-PC connection. Macs have built-in LocalTalk ports, but unless you use a dedicated 3Com or NetFrame network server (both of which come with a built-in LocalTalk port), you'll need to install a special LocalTalk board in your PC server to make the Mac connection.

Once the Macs and PCs are linked physically, you can choose from a number of software solutions to cement the connection. If you need a server-based LAN for centralized backup and tighter security, NetWare version 2.15C (or later) includes support for Mac-PC integration without requiring you to run any extra software on the Mac *or* on the PC server. Dayna Communications offers a specially adapted version of NetWare called DaynaNet that's optimized for easy installation on a mixed network. *3+Share* also supports Mac connectivity, but it requires additional software on both the Macs and your PC server.

If you want a peer-to-peer Mac-PC solution, TOPS 3.0 (now bundled with the powerful *InBox* E-mail package) provides an easy-to-use, menu-driven interface and leaves you plenty of workstation RAM. The only disadvantage of TOPS is that you'll need to install a separate serialized copy on each PC and Mac. If you're not in a rush, you may wish to put off buying TOPS until Apple releases Mac System 7.0, due sometime in 1990. It's supposed to include most of TOPS's features, so you won't have to buy TOPS for your Macs. System 7.0 promises to link easily to a number of PC-side NOS's, including TOPS for DOS and NetWare.

### Things to Consider

**Application Platforms** If you plan to transfer data files from Macs to PCs and back, you'll make things much easier for yourself if you buy "twinned" applications like *Microsoft Word*, *PageMaker*, and *Excel*, whose PC and Mac versions create compatible file formats.

If it isn't possible to use twinned applications, you may need a third-party utility that converts file formats across platforms. The current market leader is *MacLinkPlus* from DataViz. TOPS 3.0 comes with a similar application that converts most data files (such as those created in *1-2-3*, *WordPerfect*, and *dBASE)* to and from "foreign" formats quickly and effectively.

In the worst-case scenario, you would need to find a common file format to bridge the Mac-PC gap. DCA-RFT format is best for documents, WKS is best for spreadsheets, and TIFF and EPS (Encapsulated PostScript) are best for graphics.

**Naming Conventions** File naming is much more flexible on a Mac than on a PC. Names can be up to 32 characters long, spaces are allowed, and uppercase and lowercase are differentiated, whereas DOS requires an 8-dot-3 format and no spaces. As a result, when you list the contents of a Mac folder (Apple's equivalent of a DOS subdirectory) on your PC, a Mac file called 'John Smith's Presentation' may display as 'JOHN_SMI.THS'. To make things easier, it's a good idea to ask all your Mac users to rename their "shareable" files (as well as all files you want to back up on a PC server) using the stricter PC format.

**Printer Access** Before you decide on a network software package, check how it handles printers. For example, TOPS lets PC users print on networked Mac printers, but not vice versa.

**Architecture Choices** At the moment, NetWare's approach to multiplatform integration is the most elegant one available, since all software required to translate between Mac and PC network protocols runs on the PC server. No special software is needed on the Macs, which means Mac users can simply use the Chooser to select a NetWare server just as they would an AppleShare server. *3+*Share, on

*(continues)*

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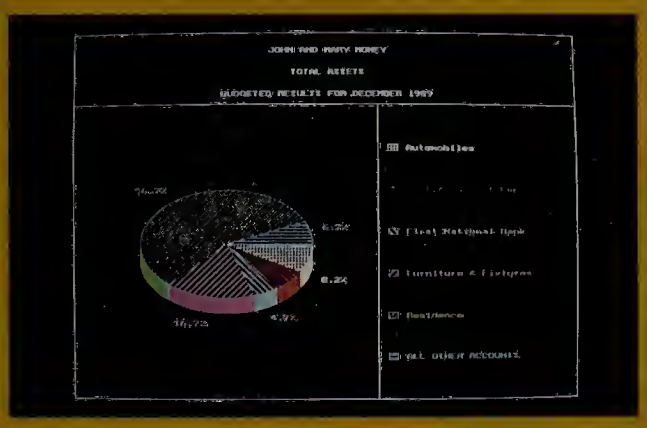


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the other hand, forces Mac users to run special 3Com software, which may conflict with Mac applications that expect to find standard Apple network software hooks (APIs). While TOPS also requires special Mac-side software, version 3.0 claims 100 percent support of Apple APIs. Its ability to run *Foxbase* provides convincing proof of this claim.

*David Ferris is the president of Ferris Networks, a San Francisco–based consulting firm specializing in networks.*

**For more information about all products in this article, circle reader service no. 903.**

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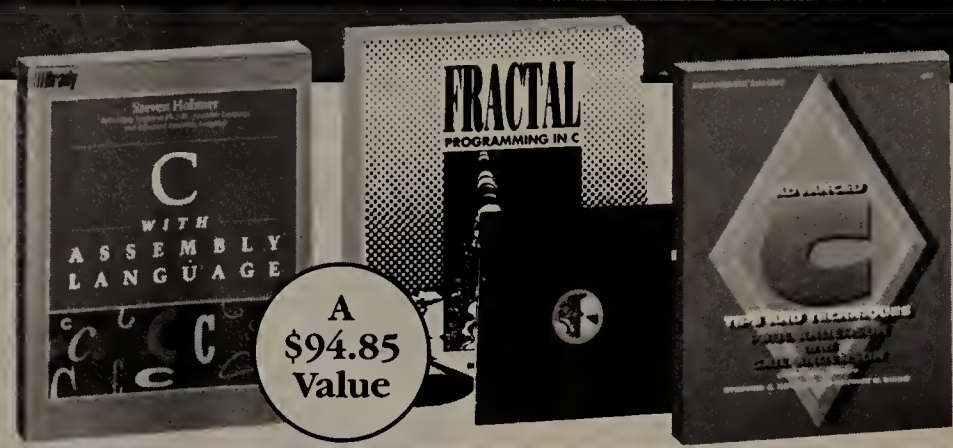


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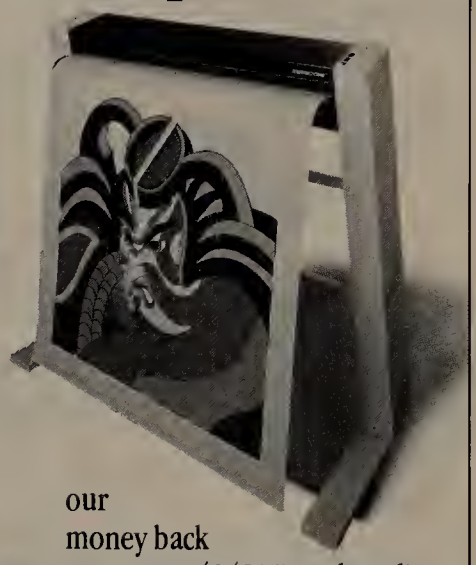

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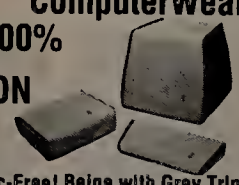

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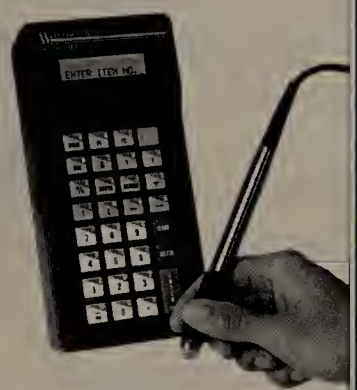

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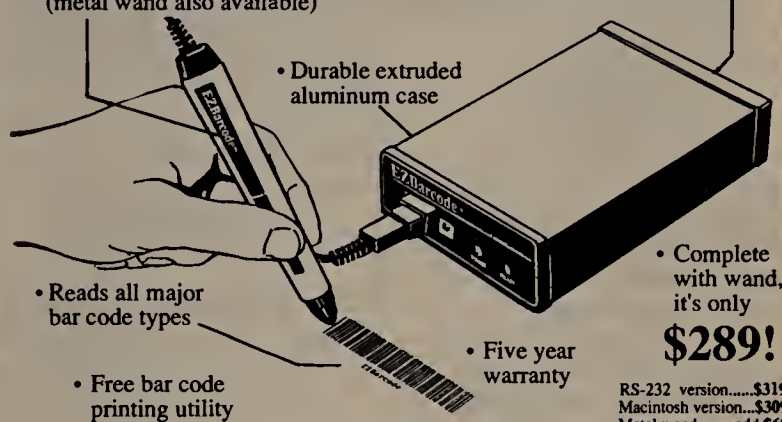


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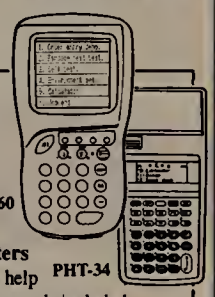


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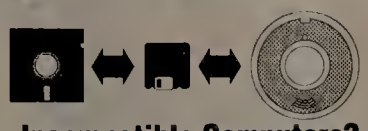

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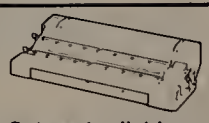

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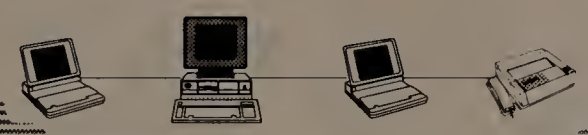

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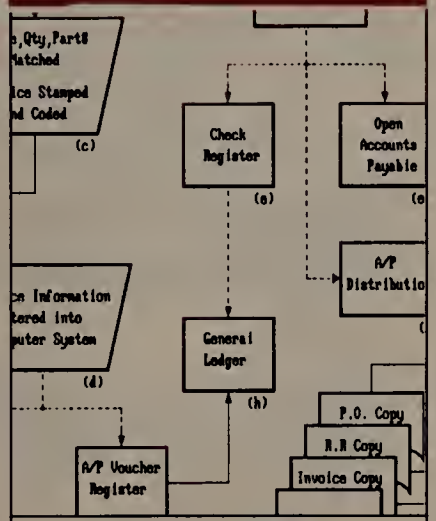


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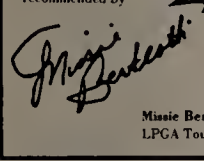

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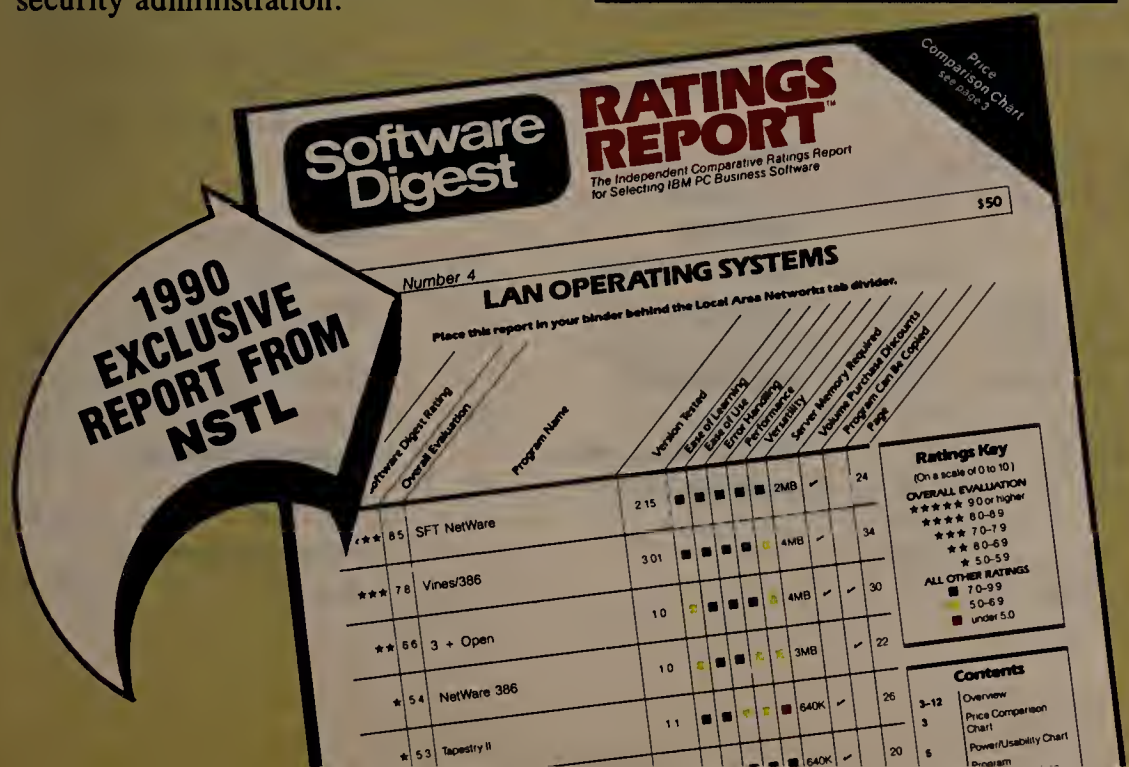


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## Advertiser Index A to Z

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| Reader Service Number | | Page Number |
|---|---|---|
| 37 | Alpha Software Corp. | 194 |
| 35 | Amdek | 191 |
| 306 | American Small Business Computers | 65 |
| — | Arlington Computer Products | 256-257 |
| 6 | Artisoft | 10 |
| — | Ashton Tate | 89 |
| 302 | ATI Technologies, Inc. | 93 |
| 14 | Autodesk | 158 |
| — | BASF | 53 |
| 25 | Bitstream, Inc. | 56 |
| — | Bloc Publishing | 18 |
| — | Bottom Line Distribution | 251 |
| 13 | Brothers Electronics | 253 |
| 215 | Buffalo Products | 62 |
| 24 | Bulldog Computers | 213A-213B |
| 17 | Caere Corp. | 24-25 |
| 19 | Canon | 97 |
| 213 | Computer Direct | 258 |
| 200 | Computer Discount Warehouse | 259 |
| 34 | ConnExperts | 188 |
| 16 | Corel System Corp. | 91 |
| 53 | CTA, Inc. | 35 |
| — | Curtis | 22, C5 |
| — | DacEasy, Inc. | 61 |
| — | Damark Int'l. | 255 |
| 277 | Datastorm Technologies | 45A |
| 280 | Datastorm Technologies | 45A |
| 57 | DCA | 169 |
| 74 | Dell Computers | C2-P1 |
| 318 | Dell Computers | 48-49 |
| 64 | Easysoft, Inc. | 5 |
| 68 | Educational Systems, Inc. | 122 |
| 72 | Everex | 31 |
| 78 | Everex | 95 |
| 156 | Fast Micro | 248-249 |
| 157 | Fast Micro | 217-217B |
| 70 | Fifth Generation Systems | 167 |
| 71 | Fifth Generation Systems | 165 |
| 84 | FinalSoft | 60 |
| 85 | Foresight Resources Corp. | 150 |
| — | Gateway 2000 | 82-83 |
| 228 | H & S Business Express | 263 |
| 110 | Halverson Associates, Inc. | 44 |
| 79 | Haventree Software Ltd. | 204 |
| 83 | Hercules Computer Corp. | 193 |
| 82 | Hewlett Packard | 41-43 |
| 113 | Hyundai Electronics | 172-173 |
| — | IBM | 57-59 |
| 109 | Intel Corp. | 36-37 |
| 41 | Kenosha Computer Center | 260 |
| 2 | LOGITECH | 27 |
| — | Lotus | 8-9, 32-33, 209 |
| — | L.A. Trade | 255 |
| 169 | Manzanita Software | 210 |
| 217 | Merritt Computer Products, Inc. | 76 |
| — | Micro Logic | 185 |
| — | Microsoft | 20-21, 54-55 |
| 172 | MIS Computers Systems | 140 |
| — | MISCO | 39B |
| 112 | Mission Cyrus | C6 |
| 314 | Mitsubishi | 218 |
| — | Montgomery Grant | 250 |
| 7 | M-USA Business Systems, Inc. | 46 |
| 193 | Nantucket | 205 |
| 188 | NEC | 28-29 |
| — | NEC Technologies | 78-79 |
| 159 | NewGen Systems | 203 |
| 196 | NSTL | 243 |
| 190 | NSTL | 211D |
| 192 | Olivetti | 211 |
| 247 | Pacific Data Products | 47 |
| 130 | Parsons Technology | 221 |
| 235 | Paul Mace Software | 148 |
| — | PC Connection | 142-147 |
| 210 | PC Globe | 139 |
| 212 | PC Publishing | 45B |
| 144 | Peachtree Software | 206 |
| 232 | Personics | 19 |
| 245 | Precision Software | 155 |
| 224 | Printers Plus | 262 |
| 201 | Project DSI | 262 |
| — | Quarterdeck | 215A-215R |
| 125 | R P Systems | 252 |
| 282 | Reference Software | 87 |
| 239 | Rose Electronics | 77 |
| 255 | Sampo | 199 |
| 31 | Secure-It | 76 |
| — | Small Computer Book Club | 223 |
| 236 | Softklone | 14 |
| 23 | SoftLogic Solutions | 50 |
| 242 | Software Publishing | 69 |
| 246 | Software Publishing | 67 |
| 252 | SPSS, Inc. | 212 |
| — | Sun Moon Star | 180-181 |
| 249 | Symantec | 38 |
| 178 | Telemart | 254 |
| 259 | Tiger Software | 98-103, 133 |
| 260 | Timeworks | 13 |
| — | TOPS | 7 |
| 257 | Toshiba | 72-73 |
| — | United Computer Express | 261 |
| 305 | Video Textbook Training | 198 |
| 308 | Warehouse Data Products | 187 |
| 325 | Western Telematic | 121 |
| 321 | WLT Systems, Inc. | 16-17 |
| 311 | WordStar, Int'l. | 45 |
| 340 | X-Tree | 200 |
| 206 | Z Soft | 156 |
| 290 | Zenith Data Systems | 197 |


## Advertiser Index by Product Category

*Get more information—circle the appropriate number on the reader service card.*


| Reader Service Number | | Page Number |
|---|---|---|
| **HARDWARE** | | |
| **Boards/Cards/Chips** | | |
| 302 | ATI Technologies, Inc. | 93 |
| 83 | Hercules Computer Corp. | 193 |
| 109 | Intel Corp. | 36-37 |
| 201 | Project DSI | 262 |
| **Computers** | | |
| 74 | Dell Computers | C2-P1 |
| 318 | Dell Computers | 48-49 |
| 72 | Everex | 31 |
| 78 | Everex | 95 |
| 157 | Fast Micro | 217-217B |
| 113 | Hyundai Electronics | 172-173 |
| — | IBM | 57-59 |
| 172 | MIS Computers Systems | 140 |
| 112 | Mission Cyrus | C6 |
| 192 | Olivetti | 211 |
| — | Sun Moon Star | 180-181 |
| 178 | Telemart | 254 |
| 257 | Toshiba | 72-73 |
| 321 | WLT Systems, Inc. | 16-17 |
| 290 | Zenith Data Systems | 197 |
| **Connectivity** | | |
| 34 | ConnExperts | 188 |
| 239 | Rose Electronics | 77 |
| 325 | Western Telematic | 121 |
| **Desktop Publishing** | | |
| 314 | Mitsubishi | 218 |
| 159 | NewGen Systems | 203 |
| 247 | Pacific Data Products | 39B |
| **Input Devices** | | |
| 2 | LOGITECH | 27 |
| — | Microsoft | 54-55 |
| **Local Area Networks** | | |
| 6 | Artisoft | 10 |
| 215 | Buffalo Products | 62 |
| 34 | ConnExperts | 188 |
| **Monitors** | | |
| 35 | Amdek | 191 |
| 314 | Mitsubishi | 218 |
| 188 | NEC | 28-29 |
| **Motherboards** | | |
| 255 | Sampo | 199 |
| **Other Peripherals** | | |
| 247 | Pacific Data Products | 47 |
| 239 | Rose Electronics | 77 |
| 325 | Western Telematic | 121 |
| **Printers/Plotters** | | |
| 19 | Canon | 97 |
| 82 | Hewlett Packard | 41-43 |
| — | NEC Technologies | 78-79 |
| 159 | NewGen Systems | 203 |
| **SOFTWARE** | | |
| **Accounting/Financial** | | |
| — | DacEasy, Inc. | 61 |
| 169 | Manzanita Software | 210 |
| 130 | Parsons Technology | 221 |
| 144 | Peachtree Software | 206 |
| **CAD/CAM** | | |
| 306 | American Small Business Computers | 65 |
| 14 | Autodesk | 158 |
| 85 | Foresight Resources Corp. | 150 |
| **Communications** | | |
| 277 | Datastorm Technologies | 45A |
| 280 | Datastorm Technologies | 45A |
| 236 | Softklone | 14 |
| **Database Management** | | |
| 37 | Alpha Software Corp. | 194 |
| 193 | Nantucket | 205 |
| 245 | Precision Software | 155 |
| 249 | Symantec | 38 |
| **Desktop Publishing** | | |
| 25 | Bitstream, Inc. | 56 |
| 53 | CTA, Inc. | 35 |
| 2 | LOGITECH | 27 |
| 246 | Software Publishing | 67 |
| 260 | Timeworks | 13 |
| 206 | Z Soft | 156 |
| **Educational** | | |
| 7 | M-USA Business Systems, Inc. | 46 |
| 210 | PC Globe | 139 |
| 305 | Video Textbook Training | 198 |
| **Fontware** | | |
| 25 | Bitstream, Inc. | 56 |
| 308 | Warehouse Data Products | 187 |
| **Graphics** | | |
| 16 | Corel System Corp. | 91 |
| — | Lotus | 8-9 |
| 235 | Paul Mace Software | 148 |
| **Integrated Software** | | |
| — | Ashton Tate | 89 |
| **Local Area Networks** | | |
| 6 | Artisoft | 10 |
| — | TOPS | 7 |
| **Management** | | |
| — | Micro Logic | 185 |
| **Other** | | |
| 79 | Haventree Software Ltd. | 204 |
| — | IBM | 57-59 |
| — | Lotus | 209 |
| **Optical Character Recognition** | | |
| 17 | Caere Corp. | 24-25 |
| **Operating Systems** | | |
| — | Quarterdeck | 215A-215R |

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| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 |
| 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 |
| 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 |
| 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 |
| 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 | 200 |
| 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 220 |
| 221 | 222 | 223 | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | 238 | 239 | 240 |
| 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 | 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 |
| 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 | 280 |
| 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 | 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 | 298 | 299 | 300 |
| 301 | 302 | 303 | 304 | 305 | 306 | 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 315 | 316 | 317 | 318 | 319 | 320 |
| 321 | 322 | 323 | 324 | 325 | 326 | 327 | 328 | 329 | 330 | 331 | 332 | 333 | 334 | 335 | 336 | 337 | 338 | 339 | 340 |
| 341 | 342 | 343 | 344 | 345 | 346 | 347 | 348 | 349 | 350 | | | | | | | | | | |

## CATALOG SECTION

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 401 | 402 | 403 | 404 | 405 | 406 | 407 | 408 | 409 | 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 | 418 | 419 | 420 |
| 421 | 422 | 423 | 424 | 425 | 426 | 427 | 428 | 429 | 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 | 438 | 439 | 440 |
| 441 | 442 | 443 | 444 | 445 | 446 | 447 | 448 | 449 | 450 | 451 | 452 | 453 | 454 | 455 | 456 | 457 | 458 | 459 | 460 |
| 461 | 462 | 463 | 464 | 465 | 466 | 467 | 468 | 469 | 470 | 471 | 472 | 473 | 474 | 475 | 476 | 477 | 478 | 479 | 480 |
| 481 | 482 | 483 | 484 | 485 | 486 | 487 | 488 | 489 | 490 | 491 | 492 | 493 | 494 | 495 | 496 | 497 | 498 | 499 | 500 |
| 501 | 502 | 503 | 504 | 505 | 506 | 507 | 508 | 509 | 510 | 511 | 512 | 513 | 514 | 515 | 516 | 517 | 518 | 519 | 520 |
| 521 | 522 | 523 | 524 | 525 | 526 | 527 | 528 | 529 | 530 | 531 | 532 | 533 | 534 | 535 | 536 | 537 | 538 | 539 | 540 |
| 541 | 542 | 543 | 544 | 545 | 546 | 547 | 548 | 549 | 550 | 551 | 552 | 553 | 554 | 555 | 556 | 557 | 558 | 559 | 560 |
| 561 | 562 | 563 | 564 | 565 | 566 | 567 | 568 | 569 | 570 | 571 | 572 | 573 | 574 | 575 | 576 | 577 | 578 | 579 | 580 |
| 581 | 582 | 583 | 584 | 585 | 586 | 587 | 588 | 589 | 590 | 591 | 592 | 593 | 594 | 595 | 596 | 597 | 598 | 599 | 600 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 601 | 602 | 603 | 604 | 605 | 606 | 607 | 608 | 609 | 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 | 618 | 619 | 620 |
| 621 | 622 | 623 | 624 | 625 | 626 | 627 | 628 | 629 | 630 | 631 | 632 | 633 | 634 | 635 | 636 | 637 | 638 | 639 | 640 |
| 641 | 642 | 643 | 644 | 645 | 646 | 647 | 648 | 649 | 650 | 651 | 652 | 653 | 654 | 655 | 656 | 657 | 658 | 659 | 660 |
| 661 | 662 | 663 | 664 | 665 | 666 | 667 | 668 | 669 | 670 | 671 | 672 | 673 | 674 | 675 | 676 | 677 | 678 | 679 | 680 |
| 681 | 682 | 683 | 684 | 685 | 686 | 687 | 688 | 689 | 690 | 691 | 692 | 693 | 694 | 695 | 696 | 697 | 698 | 699 | 700 |
| 701 | 702 | 703 | 704 | 705 | 706 | 707 | 708 | 709 | 710 | 711 | 712 | 713 | 714 | 715 | 716 | 717 | 718 | 719 | 720 |
| 721 | 722 | 723 | 724 | 725 | 726 | 727 | 728 | 729 | 730 | 731 | 732 | 733 | 734 | 735 | 736 | 737 | 738 | 739 | 740 |
| 741 | 742 | 743 | 744 | 745 | 746 | 747 | 748 | 749 | 750 | 751 | 752 | 753 | 754 | 755 | 756 | 757 | 758 | 759 | 760 |
| 761 | 762 | 763 | 764 | 765 | 766 | 767 | 768 | 769 | 770 | 771 | 772 | 773 | 774 | 775 | 776 | 777 | 778 | 779 | 780 |
| 781 | 782 | 783 | 784 | 785 | 786 | 787 | 788 | 789 | 790 | 791 | 792 | 793 | 794 | 795 | 796 | 797 | 798 | 799 | 800 |
| 801 | 802 | 803 | 804 | 805 | 806 | 807 | 808 | 809 | 810 | 811 | 812 | 813 | 814 | 815 | 816 | 817 | 818 | 819 | 820 |
| 821 | 822 | 823 | 824 | 825 | 826 | 827 | 828 | 829 | 830 | 831 | 832 | 833 | 834 | 835 | 836 | 837 | 838 | 839 | 840 |
| 841 | 842 | 843 | 844 | 845 | 846 | 847 | 848 | 849 | 850 | 851 | 852 | 853 | 854 | 855 | 856 | 857 | 858 | 859 | 860 |
| 861 | 862 | 863 | 864 | 865 | 866 | 867 | 868 | 869 | 870 | 871 | 872 | 873 | 874 | 875 | 876 | 877 | 878 | 879 | 880 |
| 881 | 882 | 883 | 884 | 885 | 886 | 887 | 888 | 889 | 890 | 891 | 892 | 893 | 894 | 895 | 896 | 897 | 898 | 899 | 900 |

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| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 901 | 902 | 903 | 904 | 905 | 906 | 907 | 908 | 909 | 910 | 911 | 912 | 913 | 914 | 915 | 916 | 917 | 918 | 919 | 920 |
| 921 | 922 | 923 | 924 | 925 | 926 | 927 | 928 | 929 | 930 | 931 | 932 | 933 | 934 | 935 | 936 | 937 | 938 | 939 | 940 |
| 941 | 942 | 943 | 944 | 945 | 946 | 947 | 948 | 949 | 950 | | | | | | | | | | |

**Advertised Products**

| | | | |
|---|---|---|---|
| Computers | 951 | Network Products | 957 |
| Data Management (PIMs) | 952 | Operating Environments | 958 |
| Desktop Pub./Graphic Software | 953 | Printers | 959 |
| Financial/Accounting | 954 | Scanners | 960 |
| Memory Boards | 955 | Video Boards | 961 |
| Monitors | 956 | Word Processing | 962 |

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| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 |
| 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 |
| 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 |
| 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 |
| 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 | 200 |
| 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 220 |
| 221 | 222 | 223 | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | 238 | 239 | 240 |
| 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 | 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 |
| 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 | 280 |
| 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 | 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 | 298 | 299 | 300 |
| 301 | 302 | 303 | 304 | 305 | 306 | 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 315 | 316 | 317 | 318 | 319 | 320 |
| 321 | 322 | 323 | 324 | 325 | 326 | 327 | 328 | 329 | 330 | 331 | 332 | 333 | 334 | 335 | 336 | 337 | 338 | 339 | 340 |
| 341 | 342 | 343 | 344 | 345 | 346 | 347 | 348 | 349 | 350 | | | | | | | | | | |

## CATALOG SECTION

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 401 | 402 | 403 | 404 | 405 | 406 | 407 | 408 | 409 | 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 | 418 | 419 | 420 |
| 421 | 422 | 423 | 424 | 425 | 426 | 427 | 428 | 429 | 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 | 438 | 439 | 440 |
| 441 | 442 | 443 | 444 | 445 | 446 | 447 | 448 | 449 | 450 | 451 | 452 | 453 | 454 | 455 | 456 | 457 | 458 | 459 | 460 |
| 461 | 462 | 463 | 464 | 465 | 466 | 467 | 468 | 469 | 470 | 471 | 472 | 473 | 474 | 475 | 476 | 477 | 478 | 479 | 480 |
| 481 | 482 | 483 | 484 | 485 | 486 | 487 | 488 | 489 | 490 | 491 | 492 | 493 | 494 | 495 | 496 | 497 | 498 | 499 | 500 |
| 501 | 502 | 503 | 504 | 505 | 506 | 507 | 508 | 509 | 510 | 511 | 512 | 513 | 514 | 515 | 516 | 517 | 518 | 519 | 520 |
| 521 | 522 | 523 | 524 | 525 | 526 | 527 | 528 | 529 | 530 | 531 | 532 | 533 | 534 | 535 | 536 | 537 | 538 | 539 | 540 |
| 541 | 542 | 543 | 544 | 545 | 546 | 547 | 548 | 549 | 550 | 551 | 552 | 553 | 554 | 555 | 556 | 557 | 558 | 559 | 560 |
| 561 | 562 | 563 | 564 | 565 | 566 | 567 | 568 | 569 | 570 | 571 | 572 | 573 | 574 | 575 | 576 | 577 | 578 | 579 | 580 |
| 581 | 582 | 583 | 584 | 585 | 586 | 587 | 588 | 589 | 590 | 591 | 592 | 593 | 594 | 595 | 596 | 597 | 598 | 599 | 600 |

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| 601 | 602 | 603 | 604 | 605 | 606 | 607 | 608 | 609 | 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 | 618 | 619 | 620 |
| 621 | 622 | 623 | 624 | 625 | 626 | 627 | 628 | 629 | 630 | 631 | 632 | 633 | 634 | 635 | 636 | 637 | 638 | 639 | 640 |
| 641 | 642 | 643 | 644 | 645 | 646 | 647 | 648 | 649 | 650 | 651 | 652 | 653 | 654 | 655 | 656 | 657 | 658 | 659 | 660 |
| 661 | 662 | 663 | 664 | 665 | 666 | 667 | 668 | 669 | 670 | 671 | 672 | 673 | 674 | 675 | 676 | 677 | 678 | 679 | 680 |
| 681 | 682 | 683 | 684 | 685 | 686 | 687 | 688 | 689 | 690 | 691 | 692 | 693 | 694 | 695 | 696 | 697 | 698 | 699 | 700 |
| 701 | 702 | 703 | 704 | 705 | 706 | 707 | 708 | 709 | 710 | 711 | 712 | 713 | 714 | 715 | 716 | 717 | 718 | 719 | 720 |
| 721 | 722 | 723 | 724 | 725 | 726 | 727 | 728 | 729 | 730 | 731 | 732 | 733 | 734 | 735 | 736 | 737 | 738 | 739 | 740 |
| 741 | 742 | 743 | 744 | 745 | 746 | 747 | 748 | 749 | 750 | 751 | 752 | 753 | 754 | 755 | 756 | 757 | 758 | 759 | 760 |
| 761 | 762 | 763 | 764 | 765 | 766 | 767 | 768 | 769 | 770 | 771 | 772 | 773 | 774 | 775 | 776 | 777 | 778 | 779 | 780 |
| 781 | 782 | 783 | 784 | 785 | 786 | 787 | 788 | 789 | 790 | 791 | 792 | 793 | 794 | 795 | 796 | 797 | 798 | 799 | 800 |
| 801 | 802 | 803 | 804 | 805 | 806 | 807 | 808 | 809 | 810 | 811 | 812 | 813 | 814 | 815 | 816 | 817 | 818 | 819 | 820 |
| 821 | 822 | 823 | 824 | 825 | 826 | 827 | 828 | 829 | 830 | 831 | 832 | 833 | 834 | 835 | 836 | 837 | 838 | 839 | 840 |
| 841 | 842 | 843 | 844 | 845 | 846 | 847 | 848 | 849 | 850 | 851 | 852 | 853 | 854 | 855 | 856 | 857 | 858 | 859 | 860 |
| 861 | 862 | 863 | 864 | 865 | 866 | 867 | 868 | 869 | 870 | 871 | 872 | 873 | 874 | 875 | 876 | 877 | 878 | 879 | 880 |
| 881 | 882 | 883 | 884 | 885 | 886 | 887 | 888 | 889 | 890 | 891 | 892 | 893 | 894 | 895 | 896 | 897 | 898 | 899 | 900 |

## PRODUCT CATEGORY INFORMATION

**For information on an entire category of products or all of the products mentioned in an article, circle the appropriate number below.**

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| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 901 | 902 | 903 | 904 | 905 | 906 | 907 | 908 | 909 | 910 | 911 | 912 | 913 | 914 | 915 | 916 | 917 | 918 | 919 | 920 |
| 921 | 922 | 923 | 924 | 925 | 926 | 927 | 928 | 929 | 930 | 931 | 932 | 933 | 934 | 935 | 936 | 937 | 938 | 939 | 940 |
| 941 | 942 | 943 | 944 | 945 | 946 | 947 | 948 | 949 | 950 | | | | | | | | | | |

**Advertised Products**

| | | | |
|---|---|---|---|
| Computers | 951 | Network Products | 957 |
| Data Management (PIMs) | 952 | Operating Environments | 958 |
| Desktop Pub./Graphic Software | 953 | Printers | 959 |
| Financial/Accounting | 954 | Scanners | 960 |
| Memory Boards | 955 | Video Boards | 961 |
| Monitors | 956 | Word Processing | 962 |

**May 1990** **Expires 9/14/90** **S2**

| Reader Service Number | | Page Number |
|---|---|---|
| | **Spreadsheets/Templates/Forms** | |
| — | Lotus | 8-9, 32-33 |
| 212 | PC Publishing | 45B |
| | **Statistics** | |
| 252 | SPSS, Inc. | 212 |
| | **Utilities** | |
| — | Bloc Publishing | 18 |
| 64 | Easysoft, Inc. | 5 |
| 70 | Fifth Generation Systems | 167 |
| 71 | Fifth Generation Systems | 165 |
| 84 | FinalSoft | 60 |
| 232 | Personics | 19 |
| 23 | SoftLogic Solutions | 50 |
| 340 | X-Tree | 200 |
| | **Windows** | |
| 57 | Crosstalk | 169 |
| 85 | Foresight Resources Corp. | 150 |
| 245 | Precision Software | 155 |
| 259 | Tiger Software | 98-103, 133 |
| | **Word Processing** | |
| 68 | Educational Systems, Inc. | 122 |
| — | Microsoft | 20-21 |
| 282 | Reference Software | 87 |
| 242 | Software Publishing | 69 |
| 311 | WordStar, Int'l. | 45 |
| | **MISCELLANEOUS** | |
| | **Computer Accessories** | |
| — | BASF | 53 |
| — | Curtis | 22, C5 |
| 68 | Educational Systems, Inc. | 122 |
| 217 | Merritt Computer Products, Inc. | 76 |
| — | MISCO | 39B |
| | **Mail Order** | |
| — | Arlington Computer Products | 256-257 |
| — | Bottom Line Distribution | 251 |
| 13 | Brothers Electronics | 253 |
| 24 | Bulldog Computers | 213A-213B |
| 213 | Computer Direct | 258 |
| 200 | Computer Discount Warehouse | 259 |
| — | Damark Int'l. | 255 |
| 156 | Fast Micro | 248-249 |
| — | Gateway 2000 | 82-83 |
| 228 | H & S Business Express | 263 |
| 41 | Kenosha Computer Center | 260 |
| — | L.A. Trade | 255 |
| — | Montgomery Grant | 250 |
| — | PC Connection | 142-147 |
| 224 | Printers Plus | 262 |
| 201 | Project DSI | 262 |
| 125 | R P Systems | 252 |
| 178 | Telemart | 254 |
| 259 | Tiger Software | 98-103,133 |
| — | United Computer Express | 261 |
| 308 | Warehouse Data Products | 187 |
| 321 | WLT Systems, Inc. | 16-17 |
| | **Periodicals/Subscriptions** | |
| 190 | NSTL | 211D |
| 196 | NSTL | 243 |

| Reader Service Number | | Page Number |
|---|---|---|
| — | Small Computer Book Club | 223 |
| | **Security** | |
| 31 | Secure-It | 76 |
| | **Service** | |
| 110 | Halverson Associates, Inc. | 44 |
| | **Supplies** | |
| — | MISCO | 47 |


## Products Featured in Editorial

*Get more information—circle the appropriate number on the reader service card.*


| Reader Service Number | | Page Number |
|---|---|---|
| | **Add-On Board** | |
| 661 | MicroMaster 386/33, Aox | 88 |
| | **CAD/CAM** | |
| 623 | AutoCAD 10 for OS/2, Autodesk | 164 |
| | **Communications** | |
| 603 | Doorway 2.05, c/o Marshall Dudley | 182 |
| 665 | Faxit for Windows, Alien Computing | 90 |
| 604 | Maxihost, c/o Don Mankin | 182 |
| 605 | TheDraw 3.3, TheSoft Programming Services | 182 |
| 622 | Unicom 1.4, Data Graphics | 159 |
| | **Computer System** | |
| 663 | Acer 1200, Acer America | 85 |
| 664 | AST Premium 486/25E EISA, AST Research | 85 |
| 666 | Regal SX, Micro Express | 92 |
| 653 | System 320LX, Dell Computer | 80 |
| 660 | T1000SE, T1000XE, T1200XE; Toshiba America Information Systems | 85 |
| 670 | Tandon 486/25, Tandon | 88 |
| 654 | 20-MHz PC386sx, NCR | 80 |
| | **Data Base Utility** | |
| 675 | Clarion Professional Developer 2.1, Clarion Report Writer; Clarion Software | 94 |
| 601 | Qedit, SemWare | 201 |
| | **Desktop Publishing** | |
| 602 | FrameMaker 2.0, Frame Technology | 160 |
| 673 | PFS: First Publisher 3.0, Software Publishing | 94 |
| | **Desktop Publishing Utility** | |
| 645 | Freedom of Press 2.2, Custom Applications | 115 |
| 646 | GoScript Plus 2.2, LaserGo | 117 |
| 648 | PreScript Deluxe 1.11, Pan Overseas Computer | 119 |



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Reader Service Number — Page Number

649 UltraScript PC Plus 2.0, QMS/Imagen ..... 120
628 VTune, ETI Software ..... 208

**Development Tool**

674 PowerBASIC 2.0, Spectra Publishing ..... 96
635 Turbo Debugger & Tools 2.0, Borland Int'l ..... 215

**Display**

610 Amdek AM/738 Smartscan, Wyse Technology ..... 137
611 Leading Technology 1432M, Leading Technology ..... 137
612 Mitsubishi FA3415, Mitsubishi Electronics America ..... 137
613 Nanao FlexScan 9060S, Nanao USA ..... 138
614 NEC MultiSync 2A, NEC Technologies ..... 138
615 NEC MultiSync 3D, NEC Technologies ..... 138
616 Panasonic PanaSync C1391, Panasonic ..... 138
617 Relisys RE5155, Relisys .... 138
618 Seiko CM-1440, Seiko Instruments USA ..... 141

**Display Adapters**

685 AST VGA, AST VGA Plus; AST Research ..... 174
698 ATD Enhanced VGA, ATD VGA; ATD ..... 174
693 AutoVGA, VGA 800/16, VGA EM-16; STB Systems ..... 174
695 8808 8-Bit VGA Board, 8816 16-Bit VGA Board, 8916 2/8 16-Bit VGA Board; Trident Microsystems ..... 174
686 Genoa SuperVGA 6100, Genoa SuperVGA 6300, Genoa SuperVGA 6400; Genoa Systems ..... 174
688 Hercules VGA Card, Hercules Computer Technology ..... 174
689 MaxVGA, MaxVGA/16; MaxLogic ..... 174
696 Paradise Basic VGA, Paradise VGA Plus 16, Paradise VGA 1024; Western Digital Imaging ..... 174
704 Peanut VGA, ProDesigner VGA; Orchid Technology ..... 174
690 Prism Eclipse VGA, Prism Elan VGA, Prism Elite VGA; Prism Imaging Systems ..... 174
703 QuadVGA Spectra, National Semiconductor ..... 174
691 RVGA I, RVGA II; Renaissance GRX Performance Graphics ..... 174
700 SuperVGA by Boca, 1024VGA by Boca, VGA by Boca; Boca Research ..... 174
702 Ultimate VGA, VGA Solution; Micro-Labs ..... 174
705 Vermont VGA, Vermont Microsystems ..... 174
694 VGA, VGA AD/GM; Tecmar ..... 174
692 VGA/H, VGA/HP16; Sigma Designs ..... 174
699 VGA Wonder, VGA Wonder VRAM; ATI Technologies ... 174
687 Video Seven Vega VGA, Video Seven VGA 1024i, Video Seven V-RAM VGA; Headland Technology ..... 174
701 Viewpoint VGA, Everex Systems ..... 174
697 WY-450 VGA Adapter, WY-460 Enhanced VGA Adapter; Wyse Technology ..... 174

**Information Management**

624 Current 1.0, IBM Desktop Software ..... 162
621 Thinx, Bell Atlantic ..... 157

**Integrated Software**

667 Enable/BP, Enable Software .. 90

**LAN Operating System**

630 Advanced NetWare/286 2.15C, Novell ..... 219
631 DaynaNet, Dayna Communications ..... 219
633 3+Share 1.51, 3Com ..... 219
634 TOPS Network Bundle for DOS, TOPS Network Bundle for Macintosh; TOPS ..... 219

**Mapping Software**

682 Infomark Express Version 1.1, Equifax Marketing Decision Systems ..... 168

**Miscellaneous**

651 Silencer 150, Silencer 220; PC Power and Cooling ..... 264

**Operating System/Environment**

680 NewWave Office, Hewlett-Packard ..... 151
681 OfficeVision, IBM ..... 151

**Printer**

636 Hewlett-Packard PaintJet XL, Hewlett-Packard ..... 127
662 Kyocera Q-8010, Kyocera Unison ..... 86
669 MicroLaser PS35, Texas Instruments ..... 92
637 Mitsubishi G330-70, Mitsubishi Electronics America ..... 127
638 NEC Colormate PS, NEC Technologies ..... 128
639 QMS ColorScript 100 Model 10, QMS ..... 129
640 Seiko CH-5504, Seiko Instruments USA ..... 130
641 Tektronix Phaser CQ, Tektronix ..... 130

**Printer Accessory**

647 PacificPage 2.58, Pacific Data Products ..... 118

**Printer Utility**

642 Microsoft Windows Color PostScript Driver, Microsoft ..... 129
643 PostScript Driver, Micrografx ..... 129

**Spreadsheet**

683 Twindows 1.0, Mosaic Marketing ..... 166
655 Wingz for OS/2 Presentation Manager, Informix Software .. 74

**Spreadsheet Utility**

650 Impress 2.2, PC Publishing ..... 189

**Utility**

677 DOS Partner 1.1, EasySoft .. 96
632 MacLinkPlus/PC, DataViz .. 219

**Word Processing**

625 Ami Professional 1.1, Samna ..... 107
626 Legend 2.0, NBI ..... 109
627 Word for Windows 1.0, Microsoft ..... 110



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**ALPS**
- Allegro 24 ..... 309

**Citizen** GSX140 ..... 315
**Diconix** 150 Plus ..... Call
**Epson-All models** ..... Call
**Fujitsu**
- DL3400 ..... 519

**NEC**
- P2200XE ..... 309
- P5200 ..... 495
- P5300 ..... 659
- LC290 ..... Call

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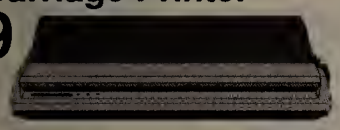

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- 182 Turbo ..... 225
- 320 (IBM) ..... 335
- 390 (IBM) ..... 469
- 393 (IBM) ..... 999

**Panasonic**
- KXP1180 ..... 175
- KXP1191 ..... 225
- KXP1124 ..... 289
- KXP1524 ..... 535
- KXP1624 ..... 429
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- NX1000-II ..... 167
- NX2410 ..... 279

**Toshiba**
- P321SL ..... 429
- P341SL ..... 599
- P351SX ..... 929

### MONITORS

**Magnavox** ..... Call
**Mitsubishi**
- 1410 EGA ..... 325
- Diamond Scan 1381 ..... 479

**NEC**
- Multisync 2a ..... 489
- Multisync GS 2a ..... 199
- Multisync 3d ..... 645
- Multisync 4d ..... 1095

**Princeton**
- Max15 ..... 237
- Ultrasync 12" ..... 479
- Ultrasync 14" ..... 519
- Ultra 16 ..... 835

**Seiko**
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- CM1450 ..... Call

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**Mitsubishi**
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- 30MB XT Kit #238 ..... 249
- 40MB AT #251-1 ..... 319
- 80MB AT #4096 ..... 559

**Toshiba**
- 360K Floppy ..... 69
- 720K 3.5" Floppy ..... 69
- 1.2MB 5.25" Floppy ..... 79
- 1.44MB 3.5" Floppy ..... 79

### BOARDS

**ATI**
- 2400 ETC Internal ..... 147
- 2400 ETC External ..... 187
- VGA Wonder 256 ..... 259
- VGA Wonder 512 ..... 309

**Everex**
- 1200B Int Modem ..... 59
- 2400B Int Modem ..... 109
- EGA Card ..... 79

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- 16 Bit VGA 256K ..... 119
- 16 Bit VGA 512K ..... 159
- 2400B Int. Modem ..... 85
- CGA or MGP Card ..... 35
- Parallel/Serial/Game Card ..... 35
- XT 1.44 Floppy Controller ..... 35

**Hercules** Graphic Card + ..... 169

**Intel**
- 8087-2 ..... 115
- 80287-10 ..... 209
- 80387-20 ..... 369
- 80387-SX ..... Call

**Orchid**
- ProDesigner ..... 229
- ProDesigner Plus ..... 319
- Tiny Turbo 286 ..... 207

**Paradise**
- Autoswitch 480 ..... 85
- VGA Plus ..... 155
- VGA 1024 256K ..... 209
- VGA 1024 512K ..... 269

**Practical Peripherals**
- 1200B Int Modem ..... 59
- 2400B Int Modem ..... 125
- 2400B Int with MNP ..... 169

**Prometheus**
- Promodem 1200B Int. ..... 49
- Promodem 2400B Int. ..... 99
- Promodem 2400G Ext. ..... Call

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- Answering Machine ..... 209
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- 2400 Baud External ..... 149

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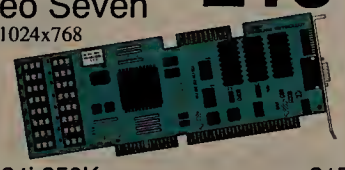

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- V-RAM VGA 512K ..... 399

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- 2400B NEC, Epson Mitsubishi or Zenith ..... 189

**Mitsubishi**
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- T1000 ..... 639
- T1000 768k Card ..... 259

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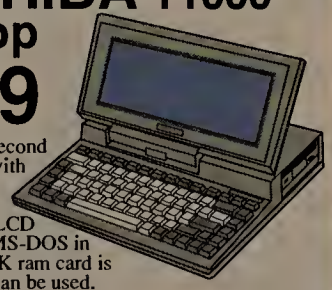

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### POWER PROTECTION

- Curtis Ruby Plus ..... 59
- Datasheild 100 ..... 57

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## SOFTWARE

### DATABASE

- Clipper ..... 399
- DataEase ..... 449
- dBase IV ..... 439
- dBXL Diamond ..... 129
- Foxbase Plus ..... 185
- FoxPro ..... 417
- Paradox ..... 419
- Q & A ..... Call
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- Rbase for DOS ..... 427
- Reflex ..... 159

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### DESKTOP PUBLISHING & GRAPHICS

- Adobe Illustrator ..... 279
- Corel Draw ..... 309
- Freelance Plus ..... 307
- GEM Artline ..... 269
- GEM Desktop Pub. ..... 159
- Generic Cadd Level 3 ..... 149
- Harvard Graphics ..... 255
- Pagemaker ..... 479
- PC Paintbrush for Windows ..... 77
- PC Paintbrush IV Plus ..... 109
- Perspective Jr. ..... 69
- PFS:First Publisher ..... 79
- Publisher's Paintbrush ..... 149
- Publish It! ..... 104
- Ventura Publisher ..... Call

### FINANCIAL

- Bedford Integrated Acct. ..... 145
- DAC Accounting 4.0 ..... Call
- DAC Payroll 4.0 ..... Call
- Dollars & Sense ..... Call
- Managing Your Money ..... 113
- Peachtree Complete III ..... 139
- Peachtree with Data Query ..... 209

### INTEGRATED

- First Choice ..... Call
- SmartWare II ..... 417
- Works ..... 89
- Windows 286 ..... 59
- Windows 386 ..... 117

### MICE

- Keytronics Professional ..... 75
- Logitech HiRes C9 Serial ..... 65
- Logitech HiRes C9 Bus ..... 76
- Logitech Trackman ..... Call
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- Macro Assembler ..... 89
- Turbo Basic ..... 60
- Turbo C ..... 90
- Turbo Pascal ..... 90
- Quick Basic ..... 60
- Quick C ..... 60
- Quick Pascal ..... 60

### SPREADSHEETS

- Allways ..... 79
- Excel ..... Call
- Lotus 1-2-3 version 2.2 ..... 325
- Lotus 1-2-3 version 3.0 ..... Call
- Lucid 3-D ..... 53
- Quattro Pro ..... 259

### UTILITIES

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- CoreFast ..... 60
- Carbon Copy Plus ..... 104
- Desklink ..... 95
- Desqview ..... 68

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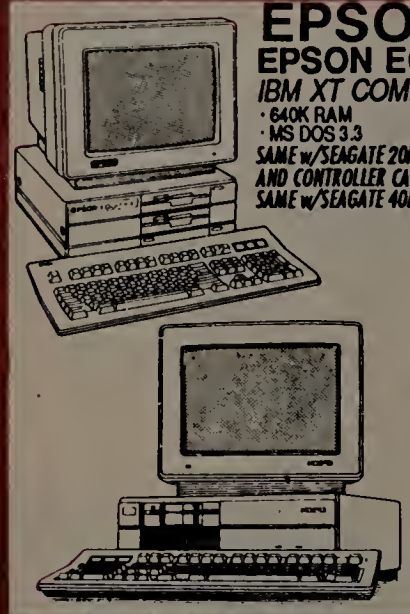

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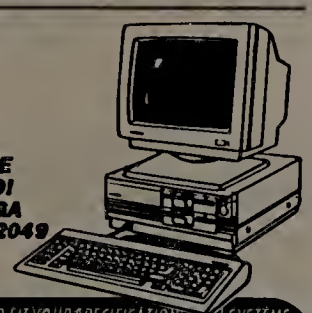

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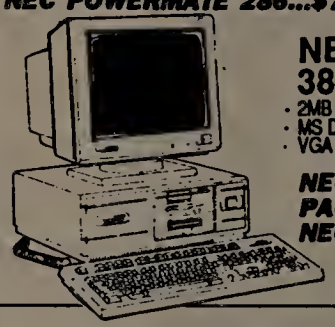

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| AMDEK 432 | $160 |
| COMPAQ Mono Amber/Green | $210 |
| COMPAQ VGA Mono | $210 |
| IBM PS/2 8503 | $200 |
| MULTISYNC GS IIA | $239 |
| PACKARD BELL Amber/Green | $85 |

## COLOR/EGA MONITORS

| | |
|---|---|
| IBM PS/2 8512 | $435 |
| PGS UltraSync | $500 |
| SAMSUNG RGB | $245 |
| Smartscan 735 | $520 |
| ZENITH 1390 | $405 |

## VGA/CAD MONITORS

| | |
|---|---|
| COMPAQ AGCM Monitor | $1399 |
| COMPAQ VGA Color | $520 |
| IBM PS/2 8513 | $515 |
| IBM PS/2 8514 | $1150 |
| MITSUBISHI 6905 | $2310 |
| NEC MultiSync 40/5D | $1130/2349 |
| NEC MultiSync 2A/30 | $495/639 |
| PACKARD BELL | $349 |
| ZENITH 1490 | $619 |

## NOVELL NETWORK

| | |
|---|---|
| HYUNDAI Diskless Workstation | $595 |
| SAMSUNG 286 Diskless Workstation 12 MHz, 640K, NE 1000 | $1150 |
| NETWARE 386 | $5600 |
| NOVELL ELS II | $1075 |
| NOVELL 286 Software V.2.15 | $1749 |
| NOVELL SFT Level II V.2.15 | $2649 |
| ARCNET PS110 | $410 |
| ARCNET PC130 | $160 |
| ARCNET PC260 | $235 |
| NE 1000 Ethernet Card | $189 |
| NE 2000 Ethernet Card | $295 |
| NE 232-32 bit Ethernet Card | $775 |
| ARCNET Passive Hub | $90 |
| ARCNET Active Hub | $469 |
| Ethernet Terminators | $38 |

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## TERMINALS

| | |
|---|---|
| WYSE 50 Amber or Green | $370 |
| WYSE 60 Amber or Green | $295 |
| WYSE 85 | $394 |
| WYSE 150 | $290 |

## SOFTWARE

| | |
|---|---|
| Aldus Pagemaker | $490 |
| COMPAQ DOS 3.31/4.0 | $89/110 |
| dBase IV | $480 |
| DisplayWrite IV | $299 |
| Harvard Graphics | $275 |
| IBM DOS 3.3/4.01 | $90/110 |
| IBM OS/2 Standard 1.2 | $255 |
| IBM OS/2 Extended 1.2 | $595 |
| Lotus 1-2-3 V 2.2/3.0 | $335/409 |
| Lotus Symphony | $450 |
| MicroSoft Windows 286/386 | $73/135 |
| MicroSoft Excell | $309 |
| MicroSoft Word/Work | $220/110 |
| Multimate Advantage 2 | $279 |
| Norton Advanced Utilities 4.5 | $85 |
| Paradox 3.0 | $439 |
| PFS First Pub | $75 |
| PFS 1st Choice | $99 |
| PFS Prowrite/File | $135/199 |
| Q&A | $230 |
| Quicken | $37 |
| Rightwriter | $59 |
| Smartcom II/III | $90/150 |
| Ventura Publisher | $533 |
| Word Perfect 5.1 | $259 |

## LASER PRINTERS

| | |
|---|---|
| HP DeskJet Plus/IIP | $675/990 |
| HP LaserJet II/IID with toner | $1649/2725 |
| HP LaserJet III | $1659 |
| HP ScanJet Plus with/IF | $1475 |
| NEC LC890 | $3150 |
| Pacific Data 25-in-1 Font | $282 |
| Pacific Data 1-2-4 | $230 |
| Pacific Page Postscript Cart | $495 |
| PANASONIC KXP4420 | $Call |
| PANASONIC KXP4450 | $1359 |
| TOSHIBA PageLaser 12-B | $2499 |

## PLOTTERS/SCANNERS, ETC.

| | |
|---|---|
| CalComp | $All |
| HP Plotter 7440A/7475A | $965/1399 |
| HP Plotter 7550 | $2920 |
| Sumasketch 12×12/12×18 | $375/630 |

## PRINTERS

| | |
|---|---|
| **Diconix** | |
| 150 Plus | $325 |
| **Epson** | |
| FX 850 260/84 cps | $529 |
| FX 1050 260/84 cps | $449 |
| LQ 510 60/180 cps | $330 |
| LQ 850 264/88 cps | $530 |
| LQ 1050 264/88 cps | $740 |
| LQ2550 400/133 cps | $929 |
| LX 810 30/180 cps | $195 |
| DFX 5000 533/80 cps | $1399 |
| **IBM** | |
| Quickwriter | $1120 |
| Quietwriter III | $1125 |
| Proprinter X24e | $615 |
| Proprinter XL 24e | $797 |
| Proprinter III XL | $645 |
| **NEC** | |
| P2200XE | $349 |
| P5200 | $507 |
| P5300 | $695 |
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| ML 172P | $210 |
| ML182 Turbo | $230 |
| 320/21 | $365/477 |
| 390/91 | $464/635 |
| 393/393 Color | $980/1089 |
| **Panasonic** | |
| KX 1180 I 192/38 cps | $179 |
| KX 1191 I 240/48 cps | $235 |
| KX 1124 192/48 cps | $299 |
| KX 1624 | $449 |
| KX 1695 *NEW!* | $Call |
| KX 1524 240/80 cps | $540 |
| **Toshiba** | |
| Expresswriter 301/311 | $333/410 |

## COMM./EMULATION

| | |
|---|---|
| AST PC XT/AT 5250 Emulation | $575 |
| EVEREX 1200 w/SW | $75 |
| EVEREX 2400 Int/Ext | $137/195 |
| HAYES 1200B Int/SCII | $243/282 |
| HAYES 1200 Ext | $277 |
| HAYES 2400 Int/Ext | $269/349 |
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| IBM PC XT/AT 5250 Emulation | $675 |
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| MEGAHERTZ 2400B | $169 |
| US ROBOTICS 1200 Int | $100 |
| US ROBOTICS 2400 Int | $159 |

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|---|---|
| AST 6 Pack w/384K | $189 |
| AST Advantage/2 for PS/2 | $Call |
| COMPAQ 1Mb | $525 |
| COMPAQ 4Mb | $1900 |
| IBM i486 Add on | $3000 |
| Intel Above Board Plus 286/512K | $395 |
| Intel Above Board II Plus OK | $295 |
| Intel Above Board MC32 OK | $399 |
| Sota 286i/386si Accel | $279/$495 |

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|---|---|
| ATI VGA Wonder 256K/512K | $279/329 |
| COMPAQ AG 1024 Board | $1049 |
| COMPAQ AG Memory Board | $425 |
| COMPAQ VOU | $145 |
| COMPAQ VGA | $419 |
| GENOA 5400 | $319 |
| PARADISE Auto Switch-480 | $195 |
| PARADISE VGA/VGA+16 | $195/285 |
| RP MonoGraphics | $69 |

## CHIPS

| | |
|---|---|
| **Intel** | |
| 8087-1/2/3 | $220/149/109 |
| 80287-6/8/10/A | $167/220/259/355 |
| 80387-33/20/25/SX | $599/400/500/325 |

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|---|---|
| AB Switchbox | $40 |
| CAP15 Power Director | $100 |
| Kensington Masterpiece Plus | $110 |
| Keytronics KB101 | $100 |
| Printer Cable 6'/10'/20' | $20/25/60 |
| 6 Outlet Surge Protector | $25 |
| 101 Key Tactile Keyboard | $75 |

## MICE

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|---|---|
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| LOGITECH BUS | $85 |
| LOGITECH C9 HiRes/PS/2 | $85 |
| LOGITECH Trackman Ser/Bus | $95/105 |
| Microsoft Mouse with Paint | $119 |
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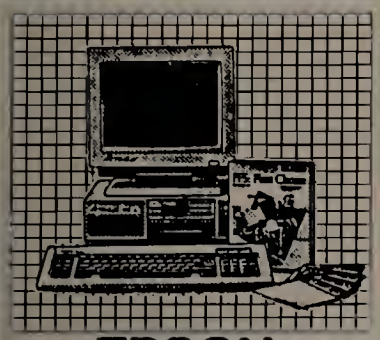

## EPSON
### EPSON APEX 100/20MG

- ☐ 8088 Computer
- ☐ 4.77/10 MHz
- ☐ 5.25" FDD
- ☐ 20MB Hard Dr.
- ☐ 640K RAM
- ☐ Parallel/Serial Game Ports
- ☐ MGA Graphics
- ☐ MS-DOS 3.3
- ☐ X-Tree Utility Software
- ☐ PFS: First Choice 3.0
- ☐ 5 I/O Slots

MODEL 100/20

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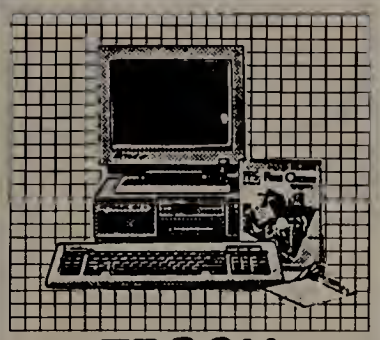

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### EPSON APEX 200/40MG

- ☐ 80286 Computer
- ☐ 8/12 MHz
- ☐ 1.2 MB FDD
- ☐ 20MB Hard Dr.
- ☐ 640K RAM
- ☐ Parallel/Serial Game Ports
- ☐ MGA Graphics
- ☐ MS-DOS 3.3
- ☐ X-Tree Utility Software
- ☐ PFS: First Choice 3.0
- ☐ 8 I/O Slots

MODEL 200/20

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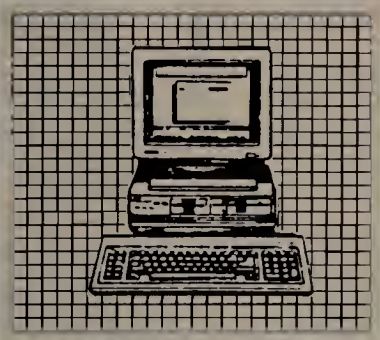

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- ☐ MS-DOS 3.3
- ☐ Phoenix BIOS
- ☐ 40 MG Hard Drive
- ☐ AT Style Key.

MODEL 286/AT

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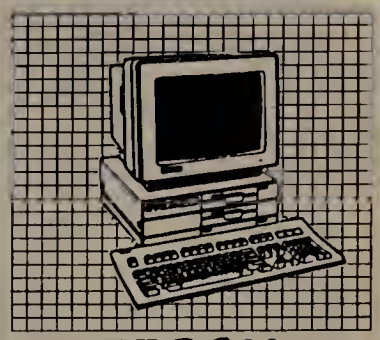

## EPSON
### EPSON EQUITY 1+

- ☐ Powerful 8088
- ☐ 640K RAM Memory
- ☐ 4.77/10MHz Microprocessor
- ☐ 5 full expand-tion slots
- ☐ 5 ¼ Floppy DD
- ☐ Built-in Clock Calendar w/separate cursor & numeric keys
- ☐ MS-DOS 3.2
- ☐ Monitor not included

EQUITY 1+

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## LAPTOP COMPUTER SYSTEMS

### TOSHIBA LAPTOPS

| | |
|---|---|
| T-1000 512K | $599 |
| T-1000 SE 1 MEG | $1097 |
| T-1200 HB Backlite 20M H.D. | CALL |
| T-1600 Backlite 20M H.D. | CALL |
| T-1600 Backlite 40M H.D. | $3190 |
| T-3200SX 16MHz 40 MB | CALL |
| T-3100SX | CALL |
| T-5200 40 MB | CALL |
| T-5200 100 MB | CALL |

### SHARP LAPTOPS

| | |
|---|---|
| 4602 2 Drive B.L. | $1090 |
| MZ-100 2 Drive B.L. | $1125 |
| 4641 | $1599 |
| 5541 | CALL |

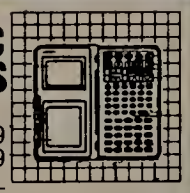
### ZENITH LAPTOPS

| | |
|---|---|
| Mini Sport 1 MEG | CALL |
| Mini Sport 2 MEG | CALL |
| 184-1 2 Floppy | CALL |
| 184-2 20 MB | CALL |
| 286 20 MB | CALL |
| 286 40 MB | CALL |

### NEC LAPTOPS

| | |
|---|---|
| Ultralite 2 MB | $1695 |
| Pro Speed 286 20 MG | $2795 |
| Pro Speed 286 40 MG | $2990 |
| Pro Speed 386 40 MG | $3890 |

## ELECTRONIC ORGANIZERS



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|---|---|
| SF-4000 | $89 |
| SF-7000 | $169 |
| SF-7500 | CALL |
| SF-8000 | CALL |
| SF-9000 | CALL |

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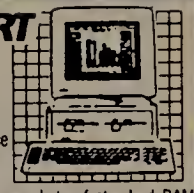
|---|---|
| WIZARD OZ-7000 | $209 |
| PSION LZ | $249 |
| ATARI PORTFOLIO | CALL |

## HEADSTART



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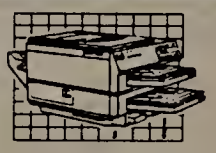

| | |
|---|---|
| HP DeskJet Plus | $675 |
| HP DeskJet IIP | $999 |
| HP LaserJet III | $1599 |
| EPSON EPL-600 | CALL |
| PANASONIC KX4450 | $1299 |

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#### STAR PRINTERS

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|---|---|
| STAR NX-1000 II | $178 |
| STAR NX-2410 | $289 |
| STAR NX-2415 | $399 |

#### PANASONIC PRINTERS

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|---|---|
| KX-1180 192/38 cps | $179 |
| KX-1191 240/48 cps | $289 |
| KX-1124 192/48 cps | $309 |
| KX-1592 180/38 cps | $379 |
| KX-1595 240/51 cps | $429 |
| KX-1524 240/80 cps | $540 |

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| | |
|---|---|
| EPSON LX 810 | IN STOCK |
| EPSON LQ 810 | IN STOCK |
| EPSON LQ 950 | IN STOCK |
| EPSON LQ 1050 | IN STOCK |
| EPSON T-1000 | IN STOCK |
| EPSON L-1000 | IN STOCK |
| EPSON T-750 | IN STOCK |
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| PC-I & PC-II | CALL |
| PC-6RE | $949 |
| PC-7 | $990 |

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| | |
|---|---|
| PANASONIC KXF-80/100/120 | CALL |
| PANASONIC KXF-220 | IN STOCK |
| PANASONIC KXF-320 | IN STOCK |
| PANAFAX | ALL MODELS PRICED LOW |
| MURATA M-900 | CALL |
| MURATA M-1600 | CALL |
| CANON FAXPHONE 15 | CALL |
| CANON FAXPHONE 23 | CALL |
| ESPON 1000/2000/3000 | CALL |
| SHARP | ALL MODELS PRICED LOW |
| TOSHIBA | ALL MODELS PRICED LOW |

## WORD PROCESSOR

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|---|---|
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| PANASONIC KXW-1510 | $549 |
| PANASONIC KXW-1000 | $439 |
| SMITH CORONA PWP-40 | $299 |
| SMITH CORONA PWP-80 | $399 |
| SMITH CORONA PWP-2000 | $349 |
| SMITH CORONA PWP-3000 | $439 |
| SMITH CORONA PWP-5000 | $459 |
| SMITH CORONA PWP-7000 | $499 |
| SMITH CORONA PWP 100 | $529 |
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- Quattro Pro ... 257
- Twin Advanced ... 60
- Twin Classic ... 30

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- FoxBase Plus ... 179
- FoxBase Pro ... 419
- Lotus Agenda ... 249
- Oracle Database Add-in ... 142
- Paradox 3.0 ... 445
- Paradox 386 ... 580
- Q & A ... 215
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- Peachtree III w/Data Query ... 209
- Profitwise Business 10 Pak ... 139
- Profitwise/Solomon Report & Graph ... 109
- Quicken 3.0 ... 34
- Tobias Managing Your Money 6.0 ... 109
- Tobias Tax Cut ... 45
- Turbo Tax ... 38

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- FoxBase Lan ... 285
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- MS Word Network Node ... 119
- Paradox Network ... 627
- PFS Professional Lan ... 277
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- R Base for OOS 1-6 Network ... 817
- Ventura Publishing Networking ... 759
- Word Perfect Additional User ... 155
- XTree Networking ... 209

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- Generic CAD Level 3 ... 155
- Math CAD ... 273
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- 1 DIR Plus ... 45
- 386 To The Max ... 42
- 386 To The Max Pro ... 72
- Above Disk ... 55
- Backup Pro ... 58
- Brooklyn Bridge ... 75
- Carousel ... 47
- Copy II PC ... 22
- Desqview ... 69
- Desqview 386 ... 116
- Direct Access ... 48
- Fastback Plus ... 98
- Formworks w/Fill & File ... 81
- Headroom ... 68
- Laplink III ... 85
- Lotus Magellan ... 135
- Mace Utilities ... 53
- MS Windows 286 ... 81
- MS Windows 386 ... 120
- Norton Commander 3.0 ... 79
- Norton Utilities 4.5 ... 53
- Optune ... 43
- PC Tools Deluxe 5.5 ... 70
- Q Dos II ... 34
- QRam ... 44
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- Publishers Paintbrush ... 159
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- Designer ... 415
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- Form Tools ... 49
- Form Works w/Fill & File ... 81
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- Graph Plus ... 319
- Harvard Graphics ... 275
- Harvard Graphics Draw Partner ... 85
- Impress ... 69
- Lotus Freelance Plus ... 315
- PC Paintbrush (For Windows) ... 79
- PC Paintbrush IV + ... 105
- PFS First Publisher Art Gallery ... 73
- Pizzaz ... 42
- Pizzaz Plus ... 65
- VP Grafix ... 56

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- Macro Assembler (MS) ... 91
- MS Basic Pro Development System ... 299
- MC C Compiler 5.1 ... 273
- MS Cobol Compiler 3.0 ... 546
- MS Fortran Compiler ... 273
- MS Quick Pascal ... 61
- Quick Basic 4.5 ... 61
- Quick C ... 61
- Ryan McFarland Fortran ... 359
- Ryan McFarland Cobol ... 739
- Turbo Basic 1.1 ... 65
- Turbo C 2.0 ... 95
- Turbo C Pro ... 159
- Turbo Pascal 5.5 Pro Pack ... 159
- Turbo Pascal Dev. Library ... 255

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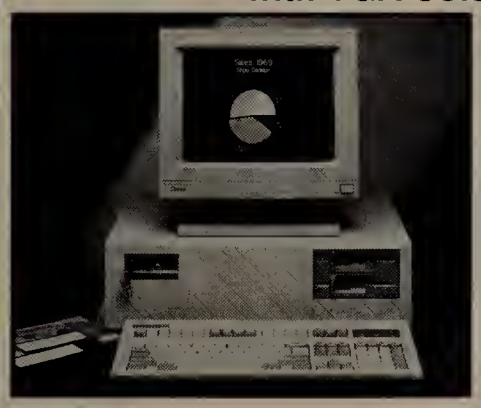

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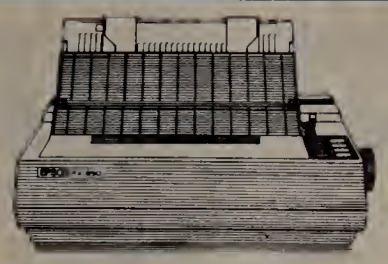
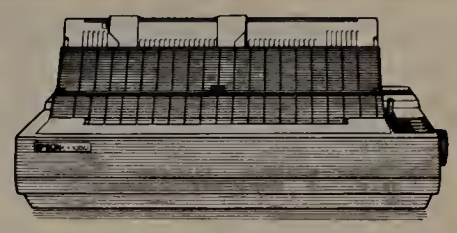


### Epson FX-850

- Narrow-carriage 9-pin, dot-matrix printer
- SmartPark,™ a unique Epson paper-handling innovation, lets you switch from fanfold to single sheets or envelopes without removing hardware or paper
- With a standard push feed tractor and single sheet friction feed, the FX-850 can handle virtually any type of paper as well as envelopes
- The FX-850 prints 290 characters per second (CPS) in high-speed draft mode (10 CPI); 54 CPS in Near Letter Quality mode (12 CPI)



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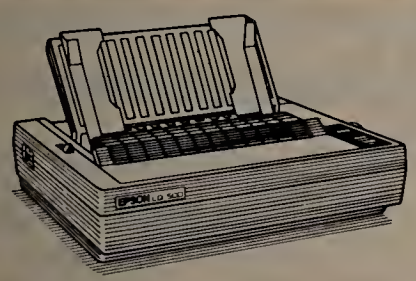
- Wide-carriage 9-pin, dot-matrix printer
- SmartPark,™ a unique Epson paper-handling innovation, lets you switch from fanfold to single sheets or envelopes without removing hardware or paper
- With a standard push feed tractor and single sheet friction feed, the FX-1050 can handle virtually any type of paper as well as envelopes
- The FX-1050 prints 290 characters per second (CPS) in high-speed draft mode (10 CPI); 54 CPS in Near Letter Quality mode (12 CPI)



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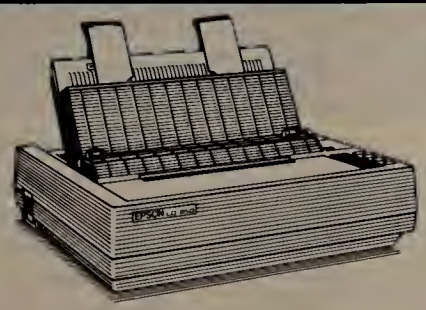
- Epson's SmartPark™
- Exclusive SelecType front control panel offers quick, easy selection of popular typestyles, fonts and pitch



### Epson LQ-850

- Epson's 24-pin, dot matrix technology creates true letter quality characters
- Epson's SmartPark™
- Exclusive SelecType front control panel offers quick, easy selection of popular typestyles, fonts and pitch
- 264 Characters per second in the high-speed draft mode delivers outstanding productivity
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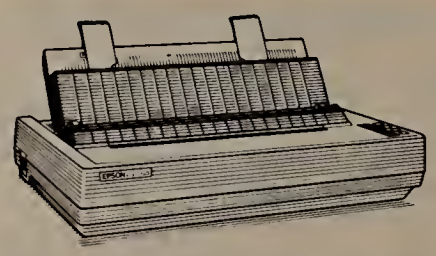
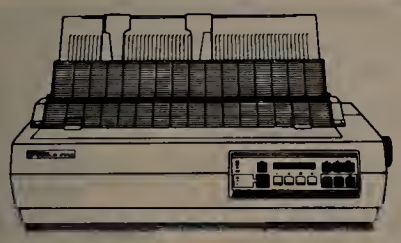


### Epson LQ-1050

- Epson's 24-pin, dot matrix technology creates true letter quality characters
- Epson's SmartPark™
- 264 Characters per second in the high-speed draft mode delivers outstanding productivity
- 88 Characters per second in Letter Quality mode for enhanced, high-resolution characters
- Exclusive SelecType front control panel offers quick, easy selection of popular typestyles, fonts and pitch



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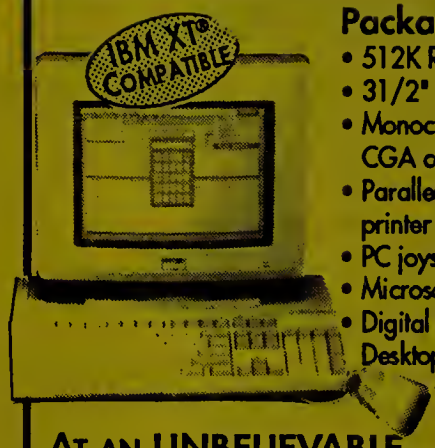


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| NOVELL NE2000 | 209.40 |
| THOMAS CONRAD 16 Port Hub | 699.25 |
| THOMAS CONRAD 8 Port Hub | 378.65 |

## MODEMS & COMMUNICATIONS

### intel

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| INTEL 2400 Internal/External | 149.75/176.94 |
| INTEL 2400B MNP 2400 Ext. MNP | 191.22/224.11 |

### PRACTICAL PERIPHERALS

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| 2400MNP Int. | $169.11 | 2400 Int. | $128.88 |
| 2400SA MNP | 197.72 | 2400SA | 172.97 |

### HAYES

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|---|---|---|---|
| 1200 External | $278.60 | 2400B Internal | $224.45 |
| 1200B Internal | 163.20 | 2400 PS/2 | 345.40 |
| 2400 External | 338.84 | | |

### U.S. Robotics

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|---|---|---|---|
| Courier 1200 | $189.60 | 1200 External | $129.10 |
| Courier 2400 | 279.60 | 2400B | 199.70 |
| 1200B | 108.45 | 14,400 HST | 586.75 |
| Dual 14,400 HST | 952.65 | | |

### MHz MEGAHERTZ CORPORATION

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| 2400 for ZENITH | $167.10 | 1200 for COMPAQ SLT | $259.80 |
| 2400 for NEC | 225.88 | 2400 for TOSHIBA | 183.74 |

## BATTERY BACKUP & SURGE

### AMERICAN

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| AME-330XT | 257.72 | AME-800RT | 699.19 |
| AME-450AT | 321.82 | | |

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| 500 Watt | $555.05 | SS700+ | $887.90 |
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| S100 | 59.55 | 6 Outlet Surge | 27.85 |

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| BPS-800 | 648.30 | | |

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| BC-1200 | 649.55 | LC-1200 | 158.85 |
| BC-2000 | 1179.80 | LC-1800 | 196.80 |

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| BASF 5 Pack of 10 DS/DD w/Case | 29.00 |
| INTELLICOM Long Link | 129.70 |
| KENSINGTON Masterpiece/Plus | 99.99/123.40 |
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| 5TH GEN. Logical Connection 256K/512K | 447.72 / 514.36 |
| Electronic 4-Way Switchbox | 99.85 |
| XT Power Supply 150 Watt | 59.00 |

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| BORLAND Quattro / Quattro Pro | 94.52 / 255.60 |
| BORLAND Sidekick Plus | 131.25 |
| 5TH GENERATION Logical Con.5.12 | 514.36 |
| MICROSOFT Excel | 299.04 |
| MICROSOFT Windows 386 | 129.05 |
| MICROSOFT Word V.5 | 214.77 |
| LAN Spool / LAN Space | 265.10 /319.00 |
| MERIDIAN Carbon Copy | 119.37 |
| PROCOMM Plus | 52.12 |
| SYMANTEC Q&A | 216.60 |
| SOFTWARE PUB. Harvard Graphics | 274.71 |
| XEROX Ventura Software Version 2.0 | 489.00 |

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| HERCULES™ Color / Mono Cards w/P | 146.14 / 179.84 |
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| GENOA 6300 / 6600 | 157.26 / 309.85 |
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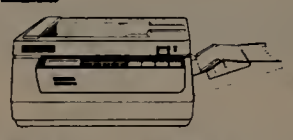

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# TAKING IT HOME

**The practical guide to home/office computing**

## All quiet on the home front

*Lawrence J. Magid*

Until recently, I dreaded turning on my home PC. No, I don't mind working at home, but the unit I have is so noisy that I sometimes find it hard to think.

This complaint may seem niggling at first, but a noisy computer can really slow down your work flow. A noise level acceptable in a busy office can be bothersome at home—especially late at night when the kids are in bed and I'm catching up on work.

Computer noise has two sources: The main culprit is the fan on the power supply, followed by the hard disk. Virtually all standard PC power supplies are made in Asia with an eye toward economy rather than noise suppression. If you want quiet, you'll probably have to pay extra. But I've found a great, inexpensive line of power supplies: PC Power and Cooling's $149 Silencer 220 for ATs and 386s, and the $129 Silencer 150 for XTs.

As their names imply, these products generate 220 and 150 watts of power, respectively. Using larger fans that rotate at a slower speed than do the high-speed fans typical of most systems, the Silencer 220 and 150—36 decibels (db) and 40db, respectively—are 69 to 84 percent quieter than conventional power supplies. The Silencer 150 also keeps your machine 50 percent cooler than standard XT power supplies. (ATs already run that much cooler than XTs.)

Most users would consider 40db comfortable, says PC Pow- and Cooling president Doug Dobson. Installation is easy—I was able to replace my old power supply with the Silencer 220 in about 20 minutes.

As for hard disks, ask your dealer to check the data sheets. If decibel levels aren't listed, call the manufacturers. If they don't know, you may want to think twice about buying those brands. Of course, you could just ask the dealer to move the equipment into a quiet room or let you return the system if it proves too noisy.

Most hard drive noise is due to drive platters' speed of 3600 rpm. A newer 3½-inch drive is generally quieter than a 5¼-inch one because it has less rotating mass, and its bearings, case, and shock mounting are designed to cause less vibration.

You'll find a 20MB Seagate 225 in most XTs and a 40MB Seagate 251 in most ATs—both are 5¼-inch drives. Seagate claims that the drives' sound levels are unrated but that its new 3½-inch ST1144 series is rated at 40db. The 3½-inch models cost about $30 more. Another option is a Micropolis drive, rated at 42db. If your dealer won't install the drive of your choice, buy your machine without a hard disk and install one yourself. It's easy.

With time, some disk drives also begin to emit a high-pitched squeal, generally caused by the disk's static discharge wire. This tiny wire (or small metal tab) rests against the disk's spindle to draw off static electricity. You could lubricate the area around the wire with a little synthetic grease. (Do not use regular grease.) But since the disk must first be backed up and removed, I suggest asking your dealer or repair service to do it.

I haven't yet upgraded my hard disk, but I have made it less noisy by tightening the chassis screws and placing a foam pad between the monitor and the system unit. I also moved my office from a spare bedroom to a quieter area of the house. So, all's quiet on the home front now—except when my 3-year-old visits my office. ●

*Lawrence J. Magid is a nationally syndicated columnist.*

**Silencer 220** $149, **Silencer 150** $129; PC Power and Cooling Co., Inc.; 619/723-9513, 619/723-0075 (fax)
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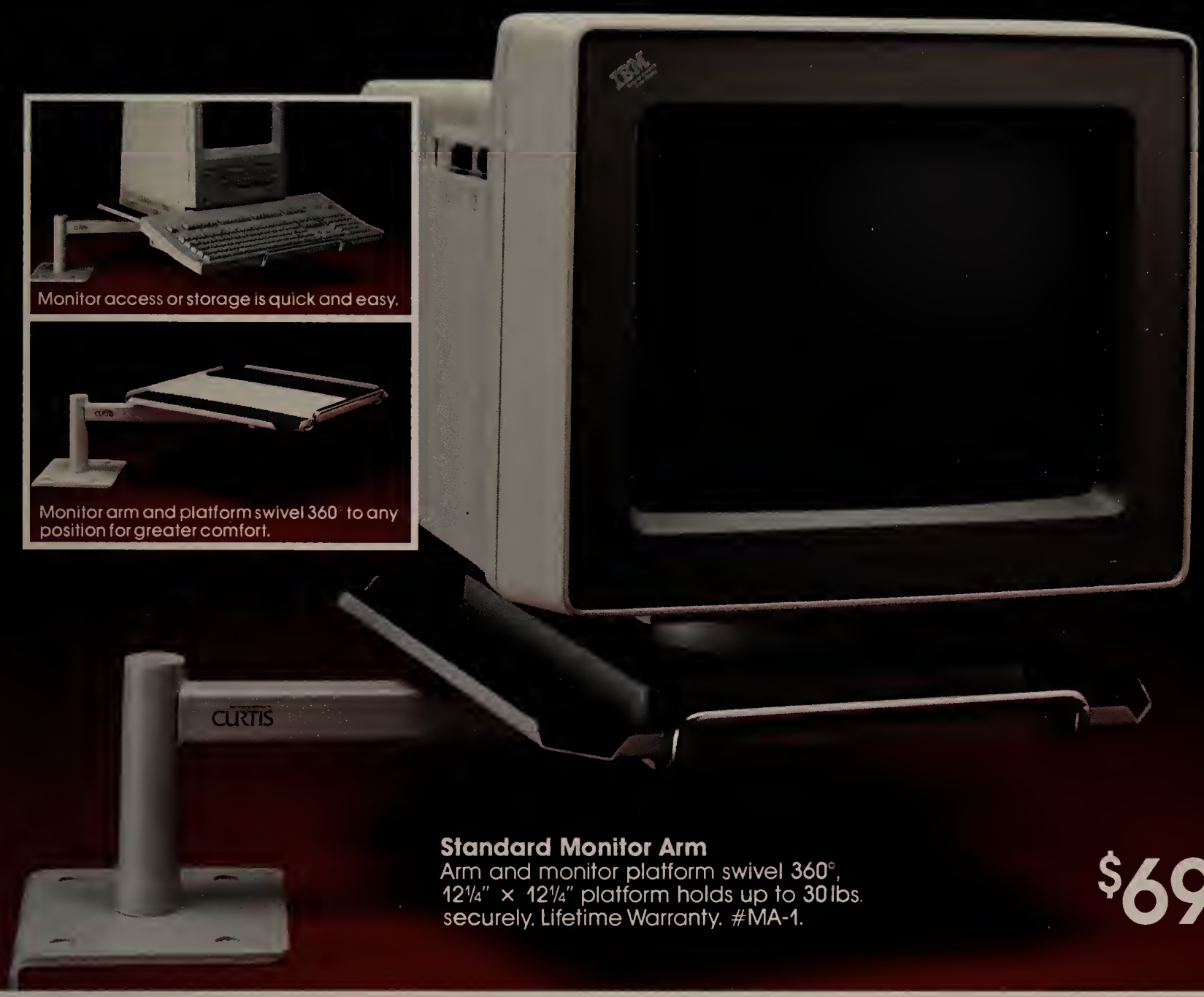


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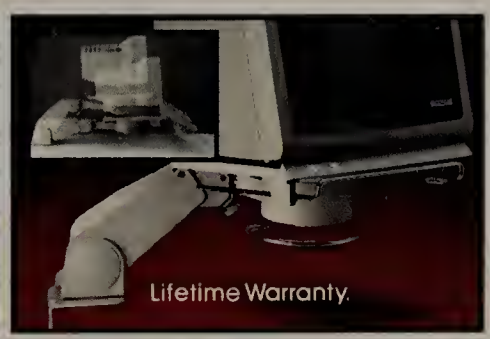
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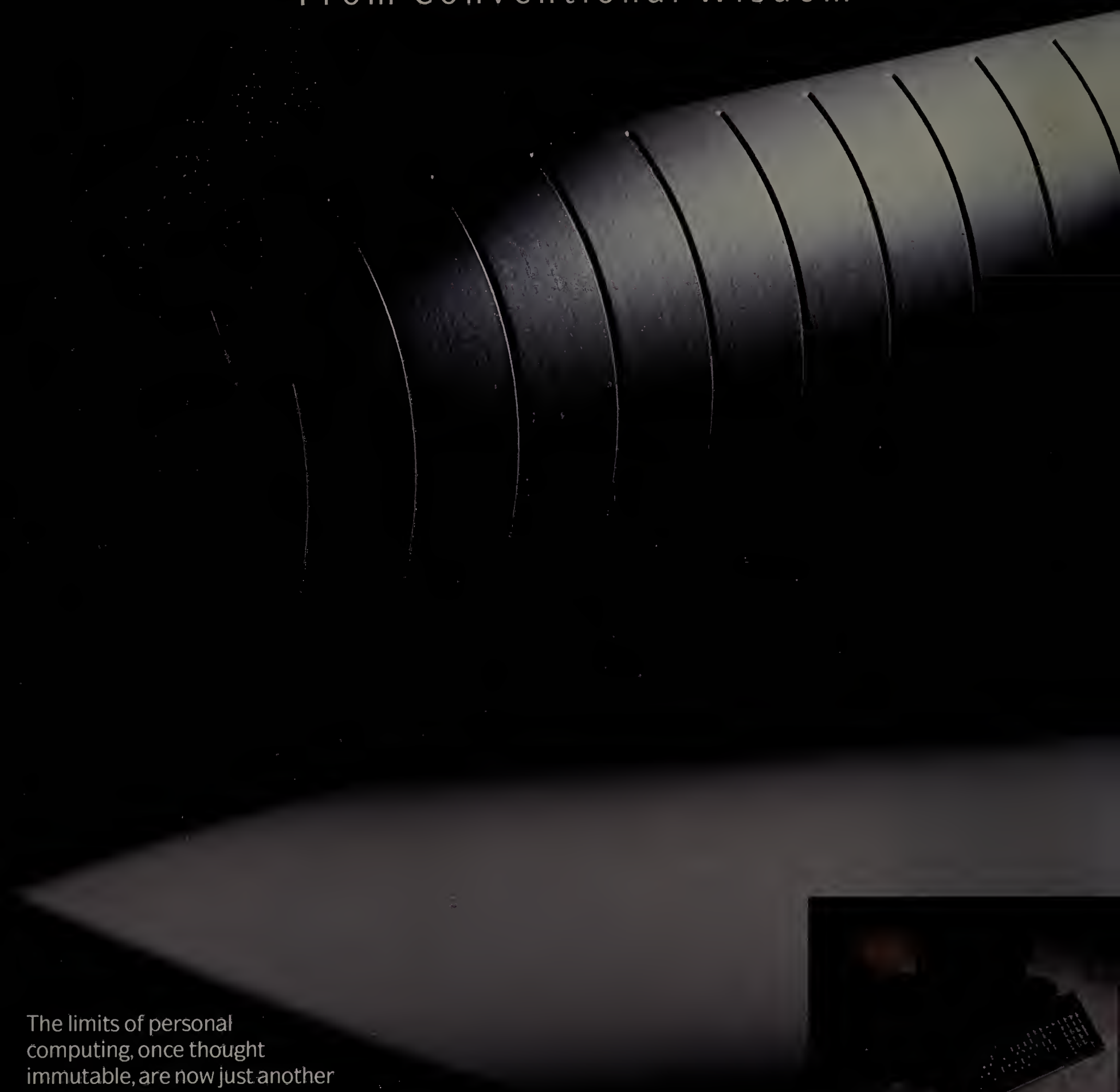

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